TROPICAL DISEASES BUREAU.

TROPICAL VETERINARY BULLETIN.

VOL. 13.] August 31, 1925. [No. 3.

DISEASES DUE TO PROTOZOAN PARASITES.

ZEISS (Heinz). **Zur diagnostischen Hodenpunktion bei Trypanosomiase.** [Puncture of the Testicle in the Diagnosis of Trypanosomiasis.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Feb. Vol. 29. No. 1. pp. 35–39.

The author has infected guineapigs with dourine by way of the prepuce and has been able to find trypanosomes subsequently in the blood and in the testicles by puncture. A small number of experiments were also carried out with the parasite of Su-auru. In this case attempts to infect by way of the prepuce failed, and the subcutaneous path was used. Parasites could not be found in the testicles of two out of the four animals infected, and when they were discovered they were in very small numbers only. The author is of the opinion that coitus plays a greater part in the transmission of trypanosome infections than has been hitherto believed.

IWANOW (Elie). **Les *Trypanosoma equiperdum* peuvent-ils pénétrer à travers les muqueuses et la peau indemnes des animaux ?** [Can *T. equiperdum* penetrate Intact Mucous Membranes or Skin.]—*C.R. Soc. Biol.* 1925. May 8. Vol. 92. No. 15. pp. 1198–1200.

The author describes in general terms some experiments in which attempts were made to infect mice with dourine by dropping blood containing immense numbers of tryanosomes into the eye. Not one out of 12 became infected, while controls inoculated subcutaneously contracted the disease.

He is of the opinion that some lesion, slight as it may be, must be present to permit of the invasion of the body through mucous membranes or skin.

YAKIMOFF (W. L.) & MATWEIEFF (W. N.). **Distribution de la dourine en Russie.** [The Distribution of Dourine in Russia.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. p. 54.

Dourine exists in practically all the studs in Russia, and in a tabular statement the authors show the number of cases occurring in 22 districts during the years 1908 to 1912. The total number was 232.

(K2707) Wt P.158/184 700 8/25 H & Sp Gp 52

YAKIMOFF (W. L.). **A propos du traitement de la dourine des chevaux par l'atoxyl.** [The Treatment of Dourine by Atoxyl.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 55–57.

This paper contains tabular statements of cases treated during the period 1910-1913.

ROSENBUSCH (F.). **Diagnostische Untersuchungen über Mal de Cadera in Argentinien.** [Investigations regarding the Diagnosis of Mal de Caderas in the Argentine.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Mar. Vol. 29. No. 3. pp. 128–135. With 3 text figs.

The microscopic examination of the sediment obtained by centrifuging the cerebro-spinal fluid of animals is superior to blood examination for the detection of parasites. The fluid was withdrawn at either the occipito-atlantal or the atlanto-axial joint with a fine trochar about 12 cm. in length, and 40-50 cc. of fluid were obtained.

DONATIEN (A.) & SALORD (Chr.). **Inoculation expérimentale de *Trypanosoma berberum* à l'âne.** [The Experimental Transmission of *T. berberum* to the Donkey.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 887–888.

So far only dromedaries, horses, and dogs have been found suffering from debab ; sheep, goats and donkeys apparently escaping infection. The susceptibility of the sheep and goat to artificial infection has been established.

The authors give details of a donkey inoculated experimentally with the parasite. They found that the course of the disease resembles that seen in dromedaries. After a brief acute phase the condition became chronic and infection was found to persist for more than three years.

YAKIMOFF (W. L.), MARCOFF (E. N.), OULASSEWITSCH (J. S.) & RASTEGAIEFF (E. F.). **Sur la répartition géographique du *Trypanosoma theileri* en Russie.** [The Distribution of *T. theileri* in Russia.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. p. 57.

The authors add the Province of Petrograd to those in which the occurrence of *T. theileri* was already known.

DIOS (R. L.) & ZUCCARINI (J. A.). **Primera comprobación de Tripanosomosis bovina en la R. Argentina.** [Bovine Trypanosomiasis in the Argentine.]—*Rev. Inst. Bact. Dept. Nac. Hyg.* 1925. Mar. Vol. 4. No. 1. pp. 80–84. With 1 plate.

A trypanosome morphologically like *T. theileri* has been detected in the Province of Entre Rios, Argentina. Inoculation and culture experiments failed.

SCHOENING (H. W.). **Complement-Fixation Tests on Serums of Cattle harbouring** *Trypanosoma americanum.*—*Amer. Jl. Trop. Med.* 1925. May. Vol. 5. No. 3. pp. 247–249.

Seventeen out of 26 normal adult cattle were found by cultural tests, to harbour *T. americanum.* Complement fixation tests failed to reveal the presence of any detectable antigen.

BRITISH MUSEUM

NAUCK (E.). **Untersuchungen über die Wirkung des Trypanosomenheilmittels "Bayer 205."** [Experiments in the Treatment of Trypanosome Infections with "Bayer 205."]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Feb. Vol. 29. No. 1. pp. 1–16.

In this paper the author describes experiments carried out with mice and rabbits with a view to ascertain the manner in which "Bayer 205" effects cures. He concludes that the process is not a simple one. There is not only a change in the medium in which the parasites are—that is to say, a general effect on the body—but a direct action on the parasite itself. The latter action does not appear to be one of direct destruction, but one which prevents multiplication and produces a decrease in virulence. There is no evidence that the drug is stored up in the red corpuscles. The direct effect within the body is more marked than that produced by either atoxyl or tartar emetic.

DIOS (R. L.). **Ensayos de tratamiento preventivo y curativo con "Bayer 205."** ["Bayer 205." Curative and Protective Properties.]—*Revist. Inst. Bact. Dept. Nac. Hyg.* 1925. Mar. Vol. 4. No. 1. pp. 51–56. [English Summary.]

1. Experiments have given satisfactory results in horses and dogs inoculated with a very virulent strain of Mal de Caderas.
2. In one experiment a single dose of 4 grammes of "Bayer 205" prevented infection in a horse subsequently injected with 70 cc. of very virulent blood.

VAN SACEGHEM (R.). **Le "205 Bayer" (Naganol) et le traitement des trypanosomiases animales.** ["Bayer 205" (Naganol) and the Treatment of Animal Trypanosomiases.]—*Bull. Agric. Congo Belge.* 1924. Dec. Vol. 15. No. 4. pp. 694–697.

Intravenous injections of a solution of "Bayer 205" in doses of 5 g. of the drug per 100 kilogs. live weight in animals experimentally infected with *T. vivax* have cleared the circulation of trypanosomes for periods not exceeding seven days. Further doses administered after relapses have caused only a temporary disappearance of the parasites.

Doses of 15 grammes per 100 kilogs. live weight are fatal.

The cost of the drug, 30 francs per gramme, renders its use impossible.

BUBBERMAN (C.), DOUWES (J. B.), & VAN BERGEN (V. E. C.). **Over de Toepassing van Bayer 205 bij de surra van het paard in Nederlandsch Indië.** [The Use of "Bayer 205" in Equine Surra in the Dutch East Indies.]—*Veeartsenijkundige Mededeeling No. 50, Depart. v. Landbouw, Nijverheid en Handel,* Buitenzorg. 1925. Feb. 64 pp.

The authors refer first to the previously published experiments of RODENWALDT and DOUWES (ref. *Trop. Vet. Bull.*, Vol. 11, p. 45), and give the further history of five horses which were still under observation when that work was published. These further results (two deaths and three definite recoveries) served to confirm the conclusions at which RODENWALDT and DOUWES had already arrived, viz., that in

equine surra " Bayer 205 " should not be given to animals which are seriously ill, and that this agent, used alone, is likely to effect a cure only in the early stages of infection, the treatment of relapses being useless.

In the experiments now recorded, the authors used (with only two exceptions) cases of natural infection, and all the animals but one were native horses, weighing 150-200 kilogms.

A. *Treatment with Fractional Doses.*

1. " *Bayer* 205 " *combined with Tartar Emetic.*—Both given in 5 per cent. solution.

(*a*) Doses of ½ gm. of each drug, given alternately, with one day intervals (*i.e.*, each drug given every second day).

Four horses ; 2 died before treatment was complete, and 2 recovered (*i.e.*, discharged after more than 18 months observation).

(*b*) Doses of ½ gm., given alternately, with intervals of 2 days.

Four horses ; 1 died before treatment was complete, and 1 about 4 months after treatment. Of the other 2, 1 recovered and the other was still under observation (7 months since last relapse).

(*c*) Doses of 1 gm., alternating, with intervals of 4 days.

Six horses, of which 1 died during treatment, 1 (with nervous symptoms) soon after treatment, and 1 had to be destroyed (being infected with glanders) before the period of observation was complete. Of the others, 2 relapsed and died, and 1 recovered, but died from colic more than a year later (sub-inoculations negative).

(*d*) Doses of 1 gm., alternating, with intervals of 7 days.

Eight horses, of which 4 died long before treatment could be completed, 1 died soon after treatment (with nervous symptoms), and 1 after showing relapse. One horse was discharged as cured, and the eighth animal, still under observation, had been free from trypanosomes in the peripheral circulation for 13 months, and appeared to be cured.

Of 22 horses treated in this way, 8 (nearly all advanced cases) died during the treatment. Five horses were discharged as cured, and 2 were in good health, but still under observation ; 1 of the latter was probably cured, but the other, which had relapsed twice, would probably break down again.

The remaining 7 horses all died after treatment ; one death appears to have been due to glanders, and the animal concerned was under observation for only a short time—no trypanosomes were seen after the treatment. Three animals showed definite relapse before death, and 3, before death, suddenly developed symptoms involving the nervous system ; no sub-inoculations were made from these 3 animals, but experience of other cases leads the authors to ascribe the deaths to persisting surra infection.

All those horses which recovered had received a total dose of 10 gms. of " Bayer 205 " and, with one exception, 10 gms. of tartar emetic. The total doses of both drugs were less than 10 gms. in 5 of the 6 horses which died of surra after treatment ; in the sixth case the doses of both reached 10 gms., but they were relatively small, as the patient, an Australian mare, was much larger than the native horses.

The authors conclude that within limits the size of the fractions into which the total dose is divided, and the length of the intervals

between their administration, are not of primary importance, but that the total doses of " Bayer 205 " and emetic should not be less than 10 gms. for native horses.

Five of the 22 horses showed symptoms of Bayer intoxication; individual susceptibility varied greatly, one animal developing symptoms after receiving 2 gms., while in another the symptoms appeared only after 6·5 gms. had been given.

2. *" Bayer* 205 *" combined with Atoxyl.*

Three horses were treated, but 1 (an advanced case) died soon after treatment commenced. Of the other two, 1 died from tetanus soon after treatment, but sub-inoculations of blood, cerebro-spinal fluid, etc., gave negative results.

The third animal, an early case, received 10 gms. of each drug within 2 months—at first in doses of 2 gms., but later in 1 gm. doses; a year later it was in good health.

B. *Treatment with Large Doses.*

Practical considerations suggested the testing of the drugs in single larger doses.

3. *" Bayer* 205 *" combined with Atoxyl.*—Of each, one dose of 3 gms.

The injection of atoxyl appeared to have the same effect, whether it was given subcutaneously or intravenously, and the order of administration of the two drugs did not seem to affect the result. The interval between the two inoculations varied from 8 to 14 days, and in 3 cases the second injection was given only when relapse occurred, and trypanosomes reappeared in the blood.

Of the 5 horses treated (3 early and 2 bad cases), 1 had to be killed (as glandered) a week after the second (Bayer) injection, and sub-inoculations gave negative results. Another horse died from the effects of a severe Bayer intoxication, combined with those of an extensive eczema. The other 3 animals were in good condition, and had shown no relapse, after 9, 9 and 7 months respectively.

4. *" Bayer* 205 *" combined with Tartar Emetic.*

Experiments on 4 horses showed clearly that, where trypanosomes are present in the peripheral blood, one should not *begin* treatment with emetic, although the doses given may be considerably smaller than those quite well tolerated by horses not suffering from surra, although poor in condition. Three of the animals reacted severely to the emetic, and died or had to be killed; in the fourth case trypanosomes reappeared in the blood, but the early onset of death appears to have been due to the effects of the emetic.

The authors suggest that emetic kills the trypanosomes more quickly than the other drugs, and so causes a rapid liberation of toxic decomposition-products.

In 4 other horses, the emetic was given only after " Bayer 205 " had cleared the peripheral circulation of trypanosomes—in 2 cases only 24 hours later—and no ill-effects were seen. All 4 horses showed some symptoms of Bayer intoxication, in one case so severe that death ensued. The other 3 horses were in good condition, and had shown no relapse, after 9, 8 and 7½ months respectively.

5. *Simultaneous Treatment with " Bayer 205 " and Atoxyl.*

At first the atoxyl was given subcutaneously, but it was later found to be quite safe to give it intravenously, at the same time as the " Bayer 205."

Three early cases were treated in this way, and all 3 showed some symptoms of Bayer intoxication, but recovered. After the lapse of 8 months they were all in good condition, and had shown no signs of relapse.

In 5 other horses, all moderately advanced or bad cases, the simultaneous inoculation of " Bayer 205 " and atoxyl was followed, after 24 hours, by the injection of emetic (1 gm. per 100 kgms. bodyweight). All developed more or less severe Bayer intoxication, and one animal, which appears to have been hyper-sensitive as well as in poor condition, died.

One horse died after developing nervous symptoms, and positive sub-inoculations showed that relapse had occurred. The treatment obviously failed in this case, and the authors admit the possibility that some of the other animals may yet relapse similarly; they believe, however, that in this case the horse was in too advanced a stage of the disease when treated, and that very advanced cases should not be treated at all.

A third horse succumbed, and post-mortem examination revealed a general degeneration of the organs; it appears not to have been infected (negative sub-inoculations).

At the time of publication, 8 months after treatment, the other 2 horses were in good health and condition, and one of them was at work.

Although the numbers involved are small, the results seem to indicate that the three-fold treatment is less promising than the combination of " Bayer 205 " and atoxyl; they suggest also that atoxyl may exercise a favourable influence on the appearance of symptoms of Bayer intoxication.

The authors conclude that, although it is not yet possible to pronounce a final judgment on its value, the most promising treatment for surra appears to be the simultaneous administration of " Bayer 205 " and atoxyl, both in non-lethal but slightly toxic doses.*

BAKKER (S.). **Een en ander over Surra in den ambtskring Padang Sidempoean.** [Notes on Surra in Padang Sidempoean.]—*Ned. Ind. Bladen v. Diergeneesk. en Dierenteelt.* 1925. Apr. Vol. 37. No. 2. pp. 153–177.

In Padang Sidempoean and neighbouring areas there is much evidence to suggest that transmission of surra from buffalo to buffalo occurs much more readily than from buffalo to horse. In some districts a number of buffaloes succumb, but in Padang Sidempoean there are fewer deaths, although a considerable proportion of the buffaloes harbour the trypanosome; most of these carriers are in excellent condition, and can perform their work without difficulty. The author considers that in this area one cannot say with certainty that any buffalo is free from the infection.

The cases in horses occur sporadically, in widely separated places, and infection must come from the buffalo, but if infected horses are allowed to remain alive, infection seems to spread quickly and easily to other horses. The number of sporadic cases in horses increases greatly in the second half of each year.

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

The author suggests that transmission is commonly effected in buffaloes by insects that have a distinct preference for buffalo blood, and in horses by others that tend to confine themselves to equine blood. He suggests also that in the second half of the year some insect appears which is particularly liable to transmit from buffalo to horse, and considers that these indications might be made the basis of useful entomological work on the problem.

He believes that dogs are more commonly attacked than is known, and emphasizes the importance of the symptoms connected with the eyes.

In considering the question of eradication, he emphasizes the difficulties of diagnosis in ruminants, and the impossibility of detecting all the carriers among the buffaloes. Moreover, to slaughter all the buffalo carriers, even if one could pick them out, would be impossible economically and not justifiable; and to quarantine apparently healthy carriers would obviously be useless.

The presence of the buffalo carrier renders eradication quite impossible, and he advises measures of limitation and control, as follows:—

When surra appears amongst horses, all horses in the district should be injected with 1 gm. of Bayer 205, and horses from outside the district should for a time not be admitted unless they are also inoculated. The animals could still be used, so that ordinary business would hardly suffer, and they would be protected from infection for a month (Rodenwaldt & Douwes). With a few injections one could protect the animals for 2 or 3 months, and from the practical point of view the outbreak could then be regarded as suppressed.

Outwardly healthy buffaloes would not need to be injected, where only equines had died; but where deaths did occur amongst buffaloes, all should be injected, or they should be isolated in a dark stable until 1½ months after the last death. Carriers should be slaughtered only when in bad condition (where infection is widespread, as in Padang Sidempoean).

The author tried this prophylactic injection with Naganol (Bayer 205), inoculating intravenously with 1 gm. in 5 per cent. solution. Altogether he inoculated 321 horses, in 7 batches varying in number from 26 to 71; the inoculation of one batch of 51 animals was repeated after a month. Many of these horses were from places where cases of surra were actually present at the time; the others were from places where surra had been causing losses, although there had been no cases for 10–12 days before the injections. None of the injected horses developed surra, and there were no complications; in no case did the Naganol cause anything more than a slight oedema, which disappeared spontaneously.

Four infected animals were treated, two with Naganol and tartar emetic, and two with atoxyl in addition to these two drugs. The Naganol was given in amounts varying from 1 to 4 gms., the total quantities administered varying from 4 to 9·2 gms., and the emetic in ½ or (usually) 1 gm. doses, with total amounts of from 3 to 4 gms. Atoxyl was given in doses of 2½ or 3 gms., with totals of 3 and 5½ gms. One of the horses died after nearly 2 months, showing paresis, etc.; a dog was inoculated with blood drawn from it on the 35th day of the treatment, but it did not become affected, and no trypanosomes reappeared in the horse's circulation; another of the horses was in good condition, etc., more than 2 months after treatment, but showed some signs of paresis in rising, and prognosis was doubtful. The

other two horses were in good condition, and showed no parasites in the blood, months after the treatment started. The animals were native horses weighing 140–150kg. No serious effects were caused by the drugs administered.

The author admits that it is still too early to judge the value of the treatment, but considers it hopeful. He emphasizes the fact that the public were keen on the drug treatment, either prophylactic or curative, whereas they are always hostile to measures involving slaughter.*

MOSCHKOWSKY (Sch.). **Über die Einwirkung von Germanin ("Bayer 205") auf Leishmanien.** [The Effects of "Bayer 205" upon Leishmania.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Feb. Vol. 29. No. 1. pp. 40-44.

The author details experiments in which "Bayer 205" was used *in vitro* on cases of oriental sore and of kala azar. In no case did the drug exert any effect.

ROSENBUSCH (F.) & GONZALEZ (R.). **Beitrag zum Studium der *Tristeza*. I. Mitteilung.** [A Contribution to the Investigation of Tristeza.]—*Arch. f. Protist.* 1925. Apr. 1. Vol. 50. No. 3. pp. 443–485. With 1 map & 8 charts in text.

The authors use the term Tristeza to cover infections with Babesia and Anaplasma in cattle.

The greater part of the paper is taken up with an account of the distribution of Tristeza in the Argentine and details of experimental inoculations. Babesiasis and anaplasmosis occur in all the tick areas. The two infections may be separated from each other experimentally by taking advantage of the fact that the incubation periods are markedly different.

Babesia infection, set up by inoculation, shows an incubation period ranging from 3 to 18 days, while in the case of anaplasmosis it varies from 17 to 35 days.

In Babesia infections intravenous inoculation shortens the periods of incubation, but the dose of infective blood given does not influence it. On the other hand, the greater the amount of blood given the shorter the period of incubation in the case of anaplasmosis, but the path of infection exerts no influence upon it.

It has not been found possible to recognize any constant morphological differences between Babesia virus from different Provinces.

After recovery from Babesiasis cattle usually harbour the parasite for from 5 to 12 months, after which recovery is complete; but in the case of anaplasmosis it would appear that infection is life long. The authors have established the infectivity of blood from an animal which was infected six years previously.

The serum from blood containing anaplasma is non-infective, the virus being present in the corpuscles only. The addition of hypotonic salt solution, leading to haemolysis, rapidly destroys the anaplasma.

The serum of cattle having latent Babesia infection has a lytic action on Babesia, but there is no similar action in Anaplasma infections.

The facts appear to suggest that while the anaplasmosis of the

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

Argentine is all of one type, the Babesiasis is not. Animals recovered from Anaplasmosis cannot be re-infected with any strains, but immunity to Babesiasis in one area does not protect animals against virus from other parts.

FONSECA (A.) & BRAGA (A.). **Noções sobre a Tristeza parasitaria dos Bovinos.** [Bovine Tristeza.] 216 pp. With numerous text figs. & charts. 1924. Rio de Janeiro: Officinas Typographicas do Ministerio da Agricultura.

This publication, which issues from the Veterinary Experimental Station of Rio de Janeiro, is a full account of tristeza, which, according to the authors, covers piroplasmosis and anaplasmosis.

CERNAIANU (C.). **Sur une épizootie de piroplasmose vraie du cheval et son agent vecteur.** [An Epizootic of Equine Piroplasmosis and the Transmitting Agent.]—*C.R. Soc. Biol.* 1925. Mar. 13. Vol. 92. No. 9. pp. 730-731.

The author describes an outbreak of equine piroplasmosis caused by *P. caballi* in Balti (Roumania) and the neighbouring villages. The epizootic lasted about two months, from April 15th to June 10th. A second outbreak occurred in October.

The only ticks found were *Dermacentor reticulatus.*

YAKIMOFF (W. L.), WASSILEWSKY (W. Z.) & ZAWIALOFF (B.). **La piroplasmose des bovidés dans le gouvernement de Pétrograde en 1923. (Note préliminaire.)** [Bovine Piroplasmosis in Petrograd in 1923. Preliminary Note.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 48–49.

In 1923, 100 milch cows were imported into the Louga district from Yaroslav, which is free from piroplasmosis. Twelve days after they were put at pasture 11 cases of piroplasmosis occurred, and of these seven proved fatal. Haemoglobinuria was observed on the 2nd or 3rd day after the rise of temperature. Diarrhoea, which was seen in the early stages, was followed by constipation on the 3rd or 4th day. The blood count fell to about 3,000,000, and more than 30 per cent. of the red corpuscles contained parasites.

Cases were treated with trypanblue, ichtargan, and luargol. The last of these appeared to cause the most rapid disappearance of parasites from the blood (72 hours), and the urine cleared within 24 hours of its administration.

In 25 per cent. of the cases there was a relapse in 17 to 35 days after treatment with a reappearance of parasites. These, however, were benign, and recovery took place without further treatment.

The parasite was *B. bovis.*

YAKIMOFF (W. L.). **La lutte anti-piroplasmique dans le gouvernement de Pétrograde en 1924. (Note préliminaire.)** [The Campaign against Piroplasmosis in Petrograd in 1924. Preliminary Note.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. p. 50.

In 1924 the average loss from piroplasmosis in the Province of Petrograd was 31 per cent.

In four selected districts trypanblue, ichtargan and luargol were used

intravenously. The great majority of animals (309) were treated with the first of these, 271 animals receiving treatment on the 1st or 2nd day of illness, the remainder on the 3rd to the 5th day. The mortality was 8 per cent. Seven animals were given 1 gramme of ichtargan and three luargol. All of these recovered.

YAKIMOFF (W. L.), WASSILEWSKY (W. J.), IWANTSCHIKOFF (M. F.), RASTEGAÏEFF (E. F.), OULASSÉWITSCH (J. S.) & ZAWIALOFF (B. W.). **Action de l'ichtargan et du luargol dans la piroplasmose bovine.** [The Action of Ichtargan and Luargol in Bovine Piroplasmosis.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 51–53.

This paper contains a detailed account of nine animals treated with Ichtargan and four with Luargol during the outbreak of Piroplasmosis in the Province of Petrograd during 1923 and 1924. A single dose was given intravenously in each case, and ranged from 0·4 to 1 gramme.

A tabular statement shows that after Ichtargan haemoglobinuria disappeared within 12 to 48 hours, and recovery took place within 24 to 72 hours. In the case of Luargol the haemoglobin disappeared from the urine in 24 to 72 hours and complete recovery occurred within the same periods.

JAKIMOW [YAKIMOFF] (W. L.), WASSILEWSKAJA (W.), BENDINGER (G.), IWANTSCHIKOW (M.), MARKOWA (E.) & ULASSEWITSCH (V.). **Zur Frage über die russischen Rinderpiroplasmosen. III. Verhältnis der nord-westlichen Piroplasmose zu anderen von demselben Typus. IV. Veränderungen des Blutes bei nord-west Piroplasmose.** [The Russian Piroplasmoses.]—*Rev. Microbiol. et Epidemiol.* 1925. Vol. 4. No. 1. pp. 84–85.

Yakimoff, in this brief German abstract of a paper in Russian, states that "our north-west piroplasma (*B. bovis*) is identical with *B. divergens.*"

Regarding the changes observed in the blood in these cases, the following details are given :—

There is a reduction in the number of red corpuscles. Anisocytosis, polychromatophilia, poikilocytosis, and normoblasts are observed.

After treatment, macrocytes with basophil stipplings make their appearance, generally about the 3rd day, and usually prior to the disappearance of the parasites.

The leucocyte count on the 1st day of haemoglobinuria in two cows was found to be normal. There is a rise when relapses occur. The leucocyte formula changes in the direction of an increase in mononuclears.

KINGSBURY (A. Neave). **On the Occurrence of *Piroplasma* (*Babesia*) *canis* in Malaya.**—*Parasitology.* 1925. May. Vol. 17. No. 2. pp. 190–191.

The author records the occurrence of canine piroplasmosis in Malaya. In the first case a microscopic examination of the blood revealed the parasite. In the second case parasites were not recognizable in the blood, but the inoculation of a puppy caused the disease.

The transmitting agent is in all probability *R. sanguineus.*

BEVAN (Ll. E. W.). **East Coast Fever—the Theory of Latency.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Nov. 20 & Dec. 11. Vol. 18. Nos. 5 & 6. pp. 328–335.

Steps are being taken to ascertain whether GONDER's account of *Theileria parva* and its life history—more particularly in the vertebrate host—is accurate in every particular. Practical experience appears to indicate that, contrary to what has been held for a good many years, complete recovery does not always occur when an animal survives an attack of East Coast fever. There would appear to be some reason for supposing that the parasite may persist in the ox in some unrecognized form or in some organ, and that such parasites may be the cause of recrudescences of the disease.

RHODESIA. **Report of Veterinary Conference held at Bulawayo on the 4th, 5th and 6th November, 1924.**—Issued by Authority of the Minister of Agriculture. Salisbury: Argus P. & P. Co., Ltd. pp. 2–44.

The main discussions of this Conference centred about the question as to whether an animal which has recovered from East Coast fever is entirely free from the causal organism or not.

LESTOQUARD (F.). **Troisième note sur les piroplasmoses du mouton en Algérie. La piroplasmose vraie :** *Piroplasma* (*s.str.*) *ovis* (*n. sp.*). **Comparaison avec** *Babesiella ovis.* [True Piroplasmosis of Sheep in Algeria. Comparison between *Piroplasma ovis* and *Babesiella ovis.*]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 140–145. With 12 text figs.

Piroplasmosis in sheep appears to have been generally accepted as a single entity caused by one type of parasite only, but it appears to be not improbable that this is in reality an error.

Lestoquard has been able to identify the parasite known as *Babesiella ovis* in Algerian sheep, and now describes *Piroplasma* (*sen. str.*) *ovis.*

The parasite belongs to the genus Piroplasma and sub-genus Piroplasma. Typically, it occurs in the twin form, the parasites forming an acute angle with each other, and each having a length exceeding, or at least equal to, the radius of the red corpuscle. The average length is 3 microns.

The parasite is readily inoculable. It causes an acute attack which is followed by a prolonged chronic infection.

The period of incubation in experimental cases depends upon the source of the virus. If it is taken from an animal that has been infected for a long time, it, as a rule, exceeds a week, but by progressive rapid passage this period may be reduced to 3-6 days, or even less.

When infection occurs the temperature rises, and remains elevated for 4 to 8 days, parasites appearing in the blood at the same time. In some cases parasites persist in the blood in recognizable numbers after the temperature has fallen, but this is not usually the case. On an average only 1 per cent. of the corpuscles become invaded.

In experimental cases the destruction of red corpuscles may amount to 50 per cent. Jaundice and haemoglobinuria do not as a rule occur, but both may be observed.

intravenously. The great majority of animals (309) were treated with the first of these, 271 animals receiving treatment on the 1st or 2nd day of illness, the remainder on the 3rd to the 5th day. The mortality was 8 per cent. Seven animals were given 1 gramme of ichtargan and three luargol. All of these recovered.

YAKIMOFF (W. L.), WASSILEWSKY (W. J.), IWANTSCHIKOFF (M. F.), RASTEGAÏEFF (E. F.), OULASSÉWITSCH (J. S.) & ZAWIALOFF (B. W.). **Action de l'ichtargan et du luargol dans la piroplasmose bovine.** [The Action of Ichtargan and Luargol in Bovine Piroplasmosis.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 51–53.

This paper contains a detailed account of nine animals treated with Ichtargan and four with Luargol during the outbreak of Piroplasmosis in the Province of Petrograd during 1923 and 1924. A single dose was given intravenously in each case, and ranged from 0·4 to 1 gramme.

A tabular statement shows that after Ichtargan haemoglobinuria disappeared within 12 to 48 hours, and recovery took place within 24 to 72 hours. In the case of Luargol the haemoglobin disappeared from the urine in 24 to 72 hours and complete recovery occurred within the same periods.

JAKIMOW [YAKIMOFF] (W. L.), WASSILEWSKAJA (W.), BENDINGER (G.), IWANTSCHIKOW (M.), MARKOWA (E.) & ULASSEWITSCH (V.). **Zur Frage über die russischen Rinderpiroplasmosen. III. Verhältnis der nord-westlichen Piroplasmose zu anderen von demselben Typus. IV. Veränderungen des Blutes bei nord-west Piroplasmose.** [The Russian Piroplasmoses.]—*Rev. Microbiol. et Epidemiol.* 1925. Vol. 4. No. 1. pp. 84–85.

Yakimoff, in this brief German abstract of a paper in Russian, states that "our north-west piroplasma (*B. bovis*) is identical with *B. divergens.*"

Regarding the changes observed in the blood in these cases, the following details are given :—

There is a reduction in the number of red corpuscles. Anisocytosis, polychromatophilia, poikilocytosis, and normoblasts are observed.

After treatment, macrocytes with basophil stipplings make their appearance, generally about the 3rd day, and usually prior to the disappearance of the parasites.

The leucocyte count on the 1st day of haemoglobinuria in two cows was found to be normal. There is a rise when relapses occur. The leucocyte formula changes in the direction of an increase in mononuclears.

KINGSBURY (A. Neave). **On the Occurrence of *Piroplasma* (*Babesia*) *canis* in Malaya.**—*Parasitology.* 1925. May. Vol. 17. No. 2. pp. 190–191.

The author records the occurrence of canine piroplasmosis in Malaya. In the first case a microscopic examination of the blood revealed the parasite. In the second case parasites were not recognizable in the blood, but the inoculation of a puppy caused the disease.

The transmitting agent is in all probability *R. sanguineus.*

BEVAN (Ll. E. W.). **East Coast Fever—the Theory of Latency.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Nov. 20 & Dec. 11. Vol. 18. Nos. 5 & 6. pp. 328–335.

Steps are being taken to ascertain whether GONDER's account of *Theileria parva* and its life history—more particularly in the vertebrate host—is accurate in every particular. Practical experience appears to indicate that, contrary to what has been held for a good many years, complete recovery does not always occur when an animal survives an attack of East Coast fever. There would appear to be some reason for supposing that the parasite may persist in the ox in some unrecognized form or in some organ, and that such parasites may be the cause of recrudescences of the disease.

RHODESIA. **Report of Veterinary Conference held at Bulawayo on the 4th, 5th and 6th November, 1924.**—Issued by Authority of the Minister of Agriculture. Salisbury: Argus P. & P. Co., Ltd. pp. 2–44.

The main discussions of this Conference centred about the question as to whether an animal which has recovered from East Coast fever is entirely free from the causal organism or not.

LESTOQUARD (F.). **Troisième note sur les piroplasmoses du mouton en Algérie. La piroplasmose vraie :** *Piroplasma* (*s.str.*) *ovis* (*n. sp.*). **Comparaison avec** *Babesiella ovis.* [True Piroplasmosis of Sheep in Algeria. Comparison between *Piroplasma ovis* and *Babesiella ovis.*]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 140–145. With 12 text figs.

Piroplasmosis in sheep appears to have been generally accepted as a single entity caused by one type of parasite only, but it appears to be not improbable that this is in reality an error.

Lestoquard has been able to identify the parasite known as *Babesiella ovis* in Algerian sheep, and now describes *Piroplasma* (*sen. str.*) *ovis.*

The parasite belongs to the genus Piroplasma and sub-genus Piroplasma. Typically, it occurs in the twin form, the parasites forming an acute angle with each other, and each having a length exceeding, or at least equal to, the radius of the red corpuscle. The average length is 3 microns.

The parasite is readily inoculable. It causes an acute attack which is followed by a prolonged chronic infection.

The period of incubation in experimental cases depends upon the source of the virus. If it is taken from an animal that has been infected for a long time, it, as a rule, exceeds a week, but by progressive rapid passage this period may be reduced to 3-6 days, or even less.

When infection occurs the temperature rises, and remains elevated for 4 to 8 days, parasites appearing in the blood at the same time. In some cases parasites persist in the blood in recognizable numbers after the temperature has fallen, but this is not usually the case. On an average only 1 per cent. of the corpuscles become invaded.

In experimental cases the destruction of red corpuscles may amount to 50 per cent. Jaundice and haemoglobinuria do not as a rule occur, but both may be observed.

Recovery, as a rule, takes place, but not invariably. In fatal cases anaemia and splenomegaly are the principal lesions.

The infection occurs naturally in, and can be experimentally transmitted to, the goat.

Trypanblue has a marked curative effect. It is administered intravenously in 1 per cent. solution ; the dose being 0·01 g. per kilog. live weight.

In addition to the twin-pear-shaped forms, rounded, oval, and irregularly shaped parasites occur.

The parasite does not cause any increase in size of the corpuscle in the sheep, but in the goat infected corpuscles become enlarged. This is no doubt due to the fact that normally the corpuscles of the goat are distinctly smaller than those of the sheep.

The following differences are noted between *Piroplasma ovis* and *Babesiella ovis* :—

P. ovis is larger than *B. ovis*. In *P. ovis* pear-shaped forms predominate. In *B. ovis* round forms are most numerous. Where twin forms occur in *B. ovis* they form a very obtuse angle with each other. By passage it is easier to obtain an exaltation of virulence with *P. ovis* than with *B. ovis*. The anaemia which results from infection with *B. ovis* is the more severe, although the percentage of parasites invaded is smaller.

There is no cross immunity.

Trypanblue is effective in cases of infection with *P. ovis*, but is without effect in cases of infection with *B. ovis*.

PÉRARD (H.). **Recherches sur les coccidies et les coccidioses du lapin. Prophylaxie des coccidioses.** [Investigations regarding Coccidia and Coccidiosis of the Rabbit. Prophylactic Measures.]—Thèse pour le Doctorat Vétérinaire. Ecole Nat. Vét. Alfort. 1925. pp. 5–71. With 5 text figs.

The difficulties in the way of exact experimentation in connection with Coccidiosis in rabbits are very great, since practically every adult rabbit harbours parasites, and it is extremely difficult to obtain young rabbits—which alone are suitable for experiment—which have not been exposed to infection, and which can be kept free from infection. A further difficulty is to obtain a pure strain for infection. The author finds that *E. stiedae* and *E. perforans* are separate entities. The average size of *E. stiedae* is $37{\cdot}5 \times 21{\cdot}5 \mu$, while that of *E. perforans* is $25{\cdot}5 \times 15{\cdot}5 \mu$. The majority of the oocysts of *E. perforans* fall within 24-30μ in length, and of *E. stiedae* 90 per cent. are from 35-40μ in length.

The cyst wall of *E. stiedae* appears to be a little thinner than that of *E. perforans*.

A far greater percentage of parasites belonging to *E. stiedae* show micropyles than is the case with *E. perforans*. It is noticeable that when the micropyle is open the oocysts acquire a yellowish tint.

Sporulation occupies about the same length of time in the two species. Some of the parasites sporulate within two days, but the majority require 8 to 10 for the process.

In *E. perforans* the so-called residual body is always present as a fifth body in the sporulated oocyst. This structure the author believes is partly composed of a reserve of food material since it decreases in size with age, but it never disappears. In *E. stiedae*

there is no separate residual body in the oocysts, but a corresponding structure is found in each of the sporocysts. The wall of the sporocysts in *E. stiedae* is relatively thicker than that of *E. perforans*. A number of experiments have been carried out with a view to infect white rats and mice, dogs, sheep and goats with the parasites of the rabbit, but without success.

The influence of temperature upon sporulation: At 0° C. no segmentation takes place. At 5-6° C. segmentation begins about the 5th day and is complete by the end of the 2nd week. At 18-20° C. the process may be more rapid. Some of the parasites will have sporulated by the end of the 2nd day (*E. perforans*). At 38° C. *E. perforans* may be completely sporulated in 30 hours. *E. stiedae* does not sporulate at the temperature. Under no conditions, apparently, is sporulation complete in *E. stiedae* in less than 60 hours.

While at 38° C. *E. perforans* may develop within 30 hours, it is observed that a considerable proportion of the parasites do not complete the process; it appears to be arrested. Moisture is necessary, since parasites contained in faeces left exposed in the laboratory are not viable after the 3rd day.

Experiments show that exposure to air is necessary for the process of sporulation. Bacterial growth hinders or stops segmentation of oocysts.

A large number of substances have been tested with regard to their sterilizing effects, either chemical or physical, upon sporulated coccidia. Cresyl, lysol, and ammonia were found to be the most effective. 2 per cent. cresyl kills all the oocysts in 36 hours. In a 5 per cent. solution the majority are killed in 2 hours, but a period of 36 hours is required for the certain destruction of all of them. Lysol gives slightly inferior results. Ordinary "antiseptics" favour the process of sporulation by checking bacterial growth.

A 10 per cent. solution of ammonia proves fatal in about 24 hours.

The physical effects of desiccation, heat dry and moist, and cold were investigated. Desiccation alone is ineffective until a temperature of 38° C. is reached. At this temperature the question of heat comes into consideration. At 40° C. the oocysts are killed. As the temperature rises death takes place early. At 45° an hour's exposure is sufficient. At 55° C., 15 minutes exposure proves fatal.

The results obtained with moist heat were comparable to those given by dry heat. At 55° C. all oocysts were dead after 30 minutes. At 80° C. 5 to 10 seconds was sufficient.

While dry heat causes shrinkage, oocysts exposed to moist heat retain their normal appearance.

At low temperatures — 10 to — 15° C. oocysts directly exposed to the refrigerant are mostly killed, but in the centre of faecal pellets only about 50 per cent. of both *E. stiedae* and *E. perforans* are killed. The period of exposure does not appear to be mentioned. While most of the experiments were carried out with non-sporulating oocysts, because of the ease with which it could be ascertained whether they were killed or not, the point had not to be lost sight of that it is in the sporulated condition that the parasite remains in the outer world. The presence of a double protective layer—oocyst and sporocyst—in this phase might influence the vitality of the parasite and its powers of resistance.

The general inference drawn by the author is that sporulated oocysts are more resistant to disinfectants than non-sporulated parasites.

Prophylactic measures are largely based upon a knowledge of the life-history of the parasite, and essentially comprise the removal of the faeces as frequently as possible. In the case of small animals cages with gratings as floors are advisable so that the faeces may fall through, and thus may not contaminate the foodstuffs. A similar result may be achieved by moving the animals to fresh cages at required intervals. In the case of the larger animals—sheep and goats—the same principle is acted upon. Disinfection is best carried out by heat either moist or dry, that is to say, with boiling water or with a flame. The use of sulphates and other chemicals on infected pastures is useless.

SPIEGL (A.). **Ein bisher nicht bekanntes Kokzid beim Schaf.** [A Hitherto Unknown Coccidium of the Sheep.]—*Zeitsch. f. Infektionskrankh. parasit. Krankh. u. Hyg. d. Haust.* 1925. May 1. Vol. 28. No. 1. pp. 42-46.

The parasite described in this paper was found in two separate flocks in different districts in Saxony.

The oocysts measured 42 to 50·4 μ in length by 30·6-36·0 μ in breadth. The colour was a dark yellowish brown, and the contents were less clearly seen than in the common parasite of the sheep *E. faurei*. The oocyst wall was remarkably thick, measuring 3·6 μ, and was composed of two distinct layers. The inner was smooth, but the outer showed a delicate net-like wrinkling. No intermediate forms between this parasite and *E. faurei*, which was also present in large numbers, could be found.

The name *Eimeria intricata* is suggested.

MITCHELL (D. T.). **Coccidiosis in Poultry.**—*Jl. Dept. Agric. S. Africa.* 1925. May. Vol. 10. No. 5. pp. 408–416.

This paper was read before the South African Poultry Association Conference, Kimberley, January 7, 1925, and is in the nature of a résumé of our knowledge on the subject.

TRIFFITT (M. J.). **Observations on *Gastrocystis gilruthi*, a Parasite of Sheep in Britain.**—*Protozoology* (a Supplement of the *Journal of Helminthology*). 1925. May. No. 1. pp. 7–18. With 2 text figs. & 26 figs. on 2 plates.

This paper confirms and elaborates the description of the parasite given by GILRUTH (1910) and CHATTON.

The writer has examined 138 stomachs (abomasum) and the parasite has been detected in 92 per cent. of these by macroscopic examination. As early infections are probably not recognizable without microscopic examinations the actual percentage of infected animals is probably higher.

The parasites have been detected in the mucosa of the abomasum only. The largest are recognizable as whitish bodies embedded in the mucous membrane approximately 1 mm. in their longer diameter. Intact cysts could be extruded by slight pressure.

On microscopic examination the cysts were found with their long axis parallel with the gastric glands lying from 0·3 to 0·7 mm. below the surface of the membranes. They were surrounded by a small

celled infiltration. The cyst wall comprises two distinct layers with a thin zone between them in the case of the younger cysts. The outer part of the outer layer had a brush-like appearance owing to the presence of hair-like processes measuring some 18μ in length.

The cyst wall contains a single large nucleus measuring from 80-100μ by 40-60μ situated between the two layers.

The contents of the cysts are plasmodial in the young stages with a number of scattered nuclei. Subsequently, a number of cytoplasmic spheres are formed and from these spores develop. There is a residual mass of cytoplasm.

The spores are elongated slightly curved bodies with one end rounded and the other tapering. The mature ones measure 12μ by 2·5μ. Examination failed to show any evidence of cellulose in the structures.

Success did not attend attempts to cultivate the parasite, but changes were produced in spores when placed in 1 per cent. glucose similar to those described by MACGOWAN as occurring in spores of *Sarcocystis tenella* when placed in the same liquid.

It is suggested that *Sarcocystis tenella* is an aberrant form of *Gastrocystis gilruthi*, the invasion of the muscular system having been brought about by the escape of spores into the blood stream.

YAKIMOFF (W. L.), WASSILEWSKY (W. J.), ZWIETKOFF (N. A.). **Influence du chlorure de sodium sur les cultures de protozoaires.** [The Effect of Sodium Chloride upon Cultures of Protozoa.]—*Bull. Soc. Path. Exot.* 1925. Mar. 11. Vol. 18. No. 3. pp. 261–265.

An excess of sodium chloride is injurious to protozoa in culture. For the best results it should not exceed 0·25 per cent. For some organisms, *e.g.*, Oicomonas, a concentration of 0·01 per cent. is sufficient.

YAKIMOFF (W. L.), WASSILEWSKY (W. J.), & ZWIETKOFF (N. A.). **Sur la culture des protozoaires de l'intestin.** [The Cultivation of Intestinal Protozoa.]—*Bull. Soc. Path. Exot.* 1925. Mar. 11. Vol. 18. No. 3. pp. 260–261.

The authors find that the best medium is that described by FROSCH & SCHARDINGER, viz., ordinary broth, 10, water, 90, agar, 1-2.

On this medium Oicomonas, Piromonas, Prowazekia, Colpoda, and other organisms from the intestines of animals have been cultivated. This medium is not suitable for Lamblia, Chilomastix, Trichomonas, Octomitus, Trichomastix, and Spirochaetes.

BOSCHENKO (W. P.). **Infusorien des Darmtrakts des Kamels.** [The Intestinal Infusoria of Camels.]—*Rev. Microbiol. & Epidemiol.* 1925. Vol. 4. No. 1. pp. 90–91.

This abstract contains a brief account of an infusorian which the author places in the Family Isotrichidae and order Holotricha. It was found in the faeces of camels. The name given is *Infundibulorium cameli*, n. g., n. sp.

BONNE (C.). **Comparaison du spirochète des rats d'Amsterdam avec une souche française de spirochétose ictéro-hémorragique.** [A Comparison between the Spirochaete of Rats from Amsterdam and a French Strain of the Ictero-haemorrhagic Spirochaetosis.]— *Ann. Inst. Pasteur.* 1925. Jan. Vol. 39. No. 1. pp. 35–44.

In culture—diluted rabbit serum—the rat strain at first grew rather sparingly, but subsequently the cultures were as rich as those given by the other organism. The majority were 7 to 10μ in length, but forms measuring up to 50μ were occasionally seen. Morphologically the two strains could not be distinguished.

Both strains were very virulent for the guineapig, but jaundice was not invariably produced. The interval elapsing between inoculation and death was 4 or 15 days. In very rare cases guineapigs which had developed jaundice recovered. In a single batch of guineapigs which have died it is sometimes possible to find the organism in the liver in large numbers, and in other cases they cannot be detected either microscopically or by inoculation of further animals. The strains have been tested by agglutination with sera from a number of cases of infection in human beings, but no definite differences have been found.

The spirochaetes were found to be mutually protective.

OKELL (C. C.), DALLING (T.), & PUGH (L. P.). **Leptospiral Jaundice in Dogs (Yellows).**— *Veter. Jl.* 1925. Jan. Vol. 81. No. 1. pp. 3–35.

Enzootic jaundice occurs in all parts of Britain, but is more common in the country, and among kennels of sporting dogs, than in towns. It may be very fatal, the mortality reaching 95 per cent.

Clinically, hyperacute haemorrhagic and icteric types of the disease can be distinguished, but all gradations between may be observed.

The hyperacute type is characterized by its sudden onset, high temperature, which falls before death, depression, pain in the muscles of the neck and abdomen, bronchial catarrh and epistaxis, herpes of the lips and bleeding from the gums, vomiting, great thirst, blood-stained soft faeces, swelling of the face below the eyes, enlargement of the cervical glands, petechiae of the skin, conjunctivitis, but, as a rule, no jaundice.

Icteric type.—The onset may be acute or insidious. When there is well marked jaundice the temperature is generally 102° to 103° F. This falls below normal before death. Depression becomes more marked as the disease progresses. There may be bronchial râles and epistaxis is only seen occasionally. Vomiting is fairly constant, and blood may be present in the vomit. Constipation is marked, and the faeces are clay-coloured. Intussusception is frequently the immediate cause of death. The urine is dark in colour and contains albumen. Pruritus is common, and there may be conjunctivitis. Associated with acute cases there are sometimes observed cases in which there is slight fever and transient gastro-intestinal disturbance. Proof is as yet lacking that these are mild cases of the same disease. In naturally-occurring cases there is a variable amount of jaundice, but in the hyperacute cases this may be absent. There may be catarrh of the eyes and nose, and blood-stained saliva may escape from the mouth. The serous membranes may show petechiae or haemorrhages. Similar lesions may be present in the stomach. The

intestines may be severely inflamed. The liver and kidneys vary in appearance. They may be congested or pallid. The lungs show haemorrhages scattered over the surface.

In 3 cases out of 10 a leptospira was isolated which appeared to be identical with a rat strain of *L. icterohaemorrhagiae*. To explain some of their experimental results the authors invoke the theory of granule or ultra-visible forms of the parasite.

In the kennels from which natural cases were obtained rats were present, and in two outbreaks virulent leptospira were isolated from rats on the premises.

Protective serum has been prepared and used, and in nine cases it has been reported that a cure has been effected by its means.

KLARENBEEK (A.). **Uraemie, Stuttgarter Hundeseuche en Spirochaeten.** [Spirochaetes in Uraemia and Stuttgart Disease in the Dog.]—*Tijdsch. v. Diergeeneesk.* 1925. Mar. 1. Vol. 52. No. 5. pp. 222–223. With 1 plate.

The author records the occurrence of spirochaetes in the kidney in a case of uraemia in a dog.

SCHMID (G.). **Beobachtungen über eine ansteckende Hautkrankheit bei Ferkelen Verursacht durch Spirochäten.** [A Contagious Disease of the Skin of Pigs caused by a Spirochaete.]—*Berlin. Tierärzt. Wochensch.* 1925. May 29. Vol. 41. No. 22. pp. 340–342.

The author describes a disease occurring in South West Africa in which lesions of the skin of pigs are associated with the presence of spirochaetes. Tumour-like swellings were found in different parts of the body, but usually on some portion of the head.

In the case recorded by the author one pig out of seven affected was available for examination. There was a large ulcerating swelling on the side of the face, and the deeper structures had become involved, so that when the bones were boiled out the alveoli of the incisors were found to have become exposed, allowing the teeth to drop out. Microscopic examination of smears showed that the bacteria present were greatly outnumbered by spirochaetes. Subsequently, he received for examination a live pig affected with the disease. This was a sow-pig about four months old. Between the eye and the ear on the left side there was a tumour-like growth involving the skin, which was covered with a dry grey scab. On removing this there was found a deep defect in the tissues filled with a greasy glutinous material. The margins of the lesions were swollen and bled readily. While the animal was under observation the lesion steadily extended.

A few days after the pig was first seen by the author a hard painful swelling developed in the upper lip, and this in the course of a few weeks attained the size of a hen's egg. This soon came to a head; a grey glutinous pus was obtained from it. During the 5 months that the animal was under observation its general condition remained fairly good. There were occasional rises of temperature and some dullness, but these symptoms were intermittent. Spirochaetes were present in immense numbers in the material obtained from the lesions. They were never in a state of purity, but they always greatly outnumbered the bacteria present. Spirochaetes were never discovered in the blood, nor were there any signs of anaemia, as described by DODD in South Africa.

Treatment with doses of 2 to 5 cc. of 5 per cent. solution of atoxyl continued for about a month effected a practically complete cure of the skin lesions, but before healing was complete the pig unfortunately died unexpectedly. At the post-mortem examination, apart from a slight increase in the amount of cerebro-spinal fluid and marked congestion of the dura mater, no lesions were discovered in the internal organs. In the frontal sinus small collections of caseous pus were found. The bones in the areas involved were greatly reduced in thickness, and in some places actually destroyed.

Bruni (N.). **Recherches sur quelques phytoparasites de nature protozoaire.** [Some Protozoan Parasites of Plants.]—*Bull. Soc. Path. Exot.* 1925. Mar. 11. Vol. 18. No. 3. pp. 251–256. With 3 text figs.

Deschiens (R.). *Giardia cati* **(n. sp.) du chat domestique.** [*Giardia cati* (n. sp.) of the Domestic Cat.]—*C. R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1271–1272.

Franchini (G.). **Piroplasmose chez un petit loir** (*Myoxus avellanarius*). [Piroplasmosis in a Dormouse.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 881–883. With 1 text fig.

Franchini (G.). **Hématozoaires particuliers d'un oiseau** (*Hypoleis hypoleis*). [Haematozoa of *Hypoleis hypoleis*.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 884–885. With 1 text fig.

Gerlach (F.). **Über die Geflügel spirochätose in Oesterreich.** [Avian Spirochaetoses in Austria.]—*Seuchenbekämpfung.* 1925. Vol. 2. No. 3–4. pp. 189–195. With 5 text figs.

Hegner (R. W.). *Giardia felis* **n. sp. from the Domestic Cat and Giardias from Birds.**—*Amer. Jl. Hyg.* 1925. May. Vol. 5. No. 3. pp. 258–273.

Iwanow (Elie). **Les** *Trypanosoma equiperdum* **dans le corps des chenilles de** *Galleria mellonella*. [Trypanosoma in the Bodies of Caterpillars of *Galleria mellonella*.]—*C. R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1286–1287.

Nieschulz (O.). **Über die Entwicklung des Taubencoccids** *Eimeria pfeifferi* **(Labbé 1896).** [The Development of *E. pfeifferi*—Coccidium of the Pigeon.] —*Arch. f. Protist.* 1925. June. Vol. 51. No. 3. pp. 479–494.

Noller (W.) & Ruppert (H.). **Zur Kenntnis der verbreitung des Taubenkokzids** *Eimeria pfeifferi*. [The Distribution of *Eimeria pfeifferi* of the Pigeon.]—*Berlin. Tierarzt. Wochensch.* 1925. Apr. 24. Vol. 41. No. 17. pp. 257–258.

Panisset (L.) & Verge (J.). **Presence de Spirochètes chez les chiens atteints de gastro-enterite hémorragique.** [The Presence of Spirochaetes in Dogs suffering from Haemorrhagic Gastro-Enteritis.]—*C. R. Acad. Sci.* 1925. Apr. 27. Vol. 180. No. 17. pp. 1296–1297.
[This paper has appeared elsewhere and has been dealt with.]

Petrochi (J.) & Zuccarini (J. A.). **Sobre la presencia del** *Plasmodium danilewskyi* **y de Haemoproteus sp. en la sangre de los gorriones** (*Passer domesticus*) **de Buenos Aires.** [The Presence of *Plasmodium danilewskyi* and Haemoproteus sp. in *Passer domesticus* in Buenos Aires.]—*Rev. Inst. Bact. Dept. Nac. Hyg.* 1925. Mar. Vol. 4. No. 1. pp. 57–62. With 1 plate and 1 text fig.

Phisalix (Mme.). **Coccidiose intestinale de** *Vipera berus* **à** *Cyclospora babaulti*. [Intestinal Coccidiosis of a Viper caused by *Cyclospora babaulti*.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 868–871. With 14 text figs.

Phisalix (Mme.). *Cyclospora tropidonoti*, **nov. spec., Coccidie intestinale de la couleuvre à Collier.** [*Cyclospora tropidonoti* n. sp., Intestinal Coccidium of Collier's Adder.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 871–873. With 8 text figs.

PHISALIX (Mme. M.). *Coccidium persicum*, **nov. sp., parasite des voies biliaires de** *Tropidonotus natrix*, **var.** *persa* **Pallas.** [*Coccidium persicum* n. sp., in the Bile Ducts of *Tropidonotus natrix*, var. *persa* Pallas.]—*Bull. Soc. Path. Exot.* 1925. Jan. Vol. 18. No. 1. pp. 23–28. With 1 text fig.

THOMSON (J. G.). **A Giardia parasitic in a Bursate Nematode living in the Viscacha.**—*Protozoology.* (A Supplement to the *Jl. of Helminth.*) 1925. May. No. 1. pp. 1–6. With 3 text figs.

VILLELA (E.) & TORRES (C. Magarinos). **Lésions histo-pathologiques dans la paralysie expérimentale à** *Schizotrypanum cruzi* **chez le chien. Nature des cellules contenant le parasite dans le système nerveux central.** [The Histological Changes caused in Dogs infected experimentally with *Schizotrypanum cruzi*. The Nature of the Cells in which the Parasite is found in the Central Nervous System.]—*C. R. Soc. Biol.* 1925. June 19. Vol. 93. No. 21. pp. 133–135.

DISEASES DUE TO METAZOAN PARASITES.

KRANEVELD (F. C.). **Bijdrage tot de Therapie der Distomatosis in Ned. Indië.** [Contribution to the Therapeutics of Distomatosis in the Dutch Indies.]—*Veeartsenijkundige Mededeeling No. 49. Dept. v. Landbouw, Nijverheid en Handel.* Buitenzorg. 1924. 62 pp.

Fluke infestation occurs very widely in the Dutch East Indies, in cattle, sheep and buffaloes; in buffaloes and native cattle the infestations are usually light, and are only detected after death, but much more serious effects are commonly seen in milch cattle and breeding stock imported from Bengal or Europe.

The author points out that distol must be kept in a dry and cool place, and he emphasizes the importance of correct dosage in relation to body-weight.

His experiments were performed on slaughter stock, so as to be certain of the chance of performing autopsies soon after treatment; the cattle, all Java-Bengal crosses, were oxen of 2-6 years of age and weighing from 165 to 286 kilogms., while the buffaloes were oxen aged from 4 to 9 years, with weights varying from 239 to 319 kilogms.

The author attempted first to estimate the number of flukes present in each animal by counting the eggs passed out in the faeces, as recommended by MAREK. MAREK's technique was followed, but the firmer consistence of the faeces (as compared with that usually observed in Europe) rendered it necessary to dilute with three times the volume of water, instead of the two volumes recommended.

After preliminary weighing and clinical examination, the animals were kept untreated for 5-8 days, while the faeces were examined daily for eggs. They were then weighed again, and distol was administered on four successive days, usually before the morning feed; Kraneveld advises that the capsules should be greased with a little oil, or kept for a time in lukewarm water.

The examinations of the faeces were continued during the treatment, and for 4-10 days afterwards. The author remarks that the counting of the eggs demands some experience, as *Paramphistomum explanatum* is also very commonly found in cattle in the Dutch Indies, and the eggs of this species may be mistaken for those of *Fasciola hepatica*. He also states that the occurrence of a few eggs in the faeces, for a few days after treatment, does not necessarily indicate the survival of any flukes, as eggs may remain in the gall-bladder for days.

The animals were again weighed (4-14 days after treatment) and then slaughtered; the autopsy was begun within half an hour, and the examination of the liver was very thorough.

The animals treated included 13 cattle and 5 buffaloes, and 1 animal received 2 gms. less than the correct dose; in all cases the correct dose was carefully calculated from the body-weight, and the amounts given varied from 4·5 to 9 gms. (daily, for 4 days).

During the course of treatment, 3 animals showed diarrhoea, 6 exhibited loss of appetite, and 2 developed a high temperature, but these effects were not severe, and soon disappeared. The lesions found in the liver post-mortem allowed the cases to be classified as follows: 7 slight cases, 3 moderate, 6 moderately severe, and 2 severe.

All but 4 of the animals showed dead Fasciolae in the liver or gall-bladder, the numbers varying from 1 to 21; in 2 cases one partly-degenerated fluke was found, but only one living Fasciola was observed, and this was seen in an animal in which no dead or partly destroyed flukes occurred.

For the whole series of animals, the estimated total number of flukes, before treatment, was 1,347; the total number found after treatment was 78, including 75 dead, 2 partly degenerated, and 1 living fluke.

Seven of the animals showed living *Paramphistomum explanatum*, in some cases numerous, and this species appears to be unaffected by distol.

All of the animals gained in weight, but a similar increase was shown by control cattle, and it was attributed to the liberal diet.

The author considers that distol is an efficient remedy against distomatosis, and that, despite its high price, its use is to be recommended in animals of any considerable value; the elimination of even small numbers of flukes is desirable, as the liver infestation is said to influence unfavourably the course of attacks of trypanosomiasis, piroplasmosis and anaplasmosis, and to retard complete recovery after such attacks.

He recommends treatment twice a year, at the beginning and at the end of the Western monsoon.

In order to check the accuracy of MAREK's method of estimating the number of flukes present, he submitted 10 untreated cattle to daily faeces examinations for at least 10 days before slaughter, and compared the estimates with the numbers actually found. The method was found, at least under East Indian conditions, to be quite unreliable; for example, in three cattle calculated each to harbour about 25 flukes, the numbers actually found were 2, 57, and 125 respectively.*

MORISHITA (K.). **On Fasciola found in the Dilatation of the Bronchi of Cattle.**—Abstract in *Japan Med. World.* 1925. May 15. Vol. 5. No. 5. p. 129.

"The author obtained a parasite having the form like that of *Fasciola hepatica*, in trachea of cattle. It was found parasitic in that organ and caused dilatation. It occurred not very seldom. By morphological examination it was identified to belong to *Fasciola hepatica*, rather than *Fasciola gigantica*, to which it bore resemblance in some respects."

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

JOYEUX (Ch.). **Cestodes des poules d'Indochine.** [The Cestodes of Fowls in Indo-China.]—*Ann. Parasit. Hum. et Comp.* 1924. Oct. Vol. 2. No. 4. pp. 314–318. With 3 text figs.

The author has examined a collection of cestodes collected at Hué (Annam). The material was sufficiently well preserved for the diagnosis of the common parasites, but the description of a new species was somewhat difficult.

The following parasites were found :—

Raillietina (*Ransomia*) *echinobothrida*,
Raillietina (*Ransomia*) *tetragona*,
Hymenolepis carioca,
Cotugnia digonopora,
Hymenolepis bauchei, n. sp.

A detailed description of the last of these is given.

BAER (Jean G.). **Some Cestoda described by Beddard, 1911-1920.** —*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No. 1. pp. 1–22. With 15 text figs.

The parasites were found in animals dying at the Zoological Gardens in London, and the specimens examined were those loaned to FUHRMANN, who, owing to pressure of other work, was not able to carry out examinations. They were handed to Baer for scrutiny.

In the author's opinion the following names are synonyms, and must fall. The names which he considers have priority are given :—

Hyracotaenia hyracis Beddard 1912=*Inermicapsifer capensis*=*I. hyracis* (Rudolphi 1810).
Hyracotaenia procaviae=*Inermicapsifer pagenstecheri* (Setti 1897).
Thysanotaenia gambianum=*Inermicapsifer guineensis* (Graham 1908).

According to SKRJABIN :—

Otidiotaenia eupoditis=*Schistometra conoides* (Bloch 1782).

Descriptions are given of *Anoplotaenia dasyuri* Beddard 1911, *Dasyurotaenia robusta* Beddard 1912, and *Thysanotaenia lemuris* Beddard 1911.

HOBMAIER (M.). **Die Entwicklung von** *Ascaris megalocephala* **des Pferdes.** [The Development of *Ascaris megalocephala* of the Horse.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1925. Vol. 52. No. 2. p. 192–198. With 3 text figs.

The author states that he has been able to follow the migrations of the immature stages of *Ascaris megalocephala* by feeding mice, guinea-pigs, and rabbits with embryonated eggs.

In all these species the embryo leaves the eggs in the anterior part of the small intestine, and they invade the blood or lymph stream from the caecum.

In the case of mice the embryos have disappeared from the intestine on the day after the infecting meal and are to be found in the liver. At the most only an occasional parasite is to be found in the lungs at this stage. After 2 to 4 days they leave the liver and are more readily found in the lungs. By the 6th day the majority of the larvae have reached the lungs. At the end of a week they are discoverable in the mucus of the larynx, and during the course of the second week they can be seen in the mucous membrane of the stomach. In guineapigs

and rabbits the process is similar, but takes a little longer. It is exceptional to be able to trace the migrations as far as the stomach again. The author has only once succeeded in doing so.

The author describes the morphological details of the migrating larvae. The lesions are also dealt with. The passage of the larvae through the intestine and liver as a rule do not cause any obvious symptoms, but a massive invasion of the lungs may actually cause death from suffocation. In such cases there is extensive haemorrhage into the alveoli and small bronchi. The point of penetration of the worms through the bowel wall is marked by a minute haemorrhagic spot. These spots are to be found in the caecum only.

HOBMAIER (M.). **Nematodenknötchen innerer Organe, spez. von *Ascaris megalocephala*, beim Pferde.** [Nodules due to Nematodes in the Internal Organs, and in particular to *Ascaris megalocephala* in the Horse.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1925. May. Vol. 52. No. 3. pp. 273–278. With 1 text fig.

In the course of their migrations the embryos of *Ascaris megalocephala* produce nodules in the liver and lungs of horses. These have usually been thought to have been produced by *Sclerostome larvae*.

GOODEY (T.). *Oesophagostomum longicaudum* **n. sp. from the Pig in New Guinea.**—*Jl. Helminth.* 1925. Feb. Vol. 3. No. 1. pp. 45–50. With 2 text figs.

Among 114 specimens of Oesophagostomum collected from the large intestine of a cross-bred pig at Raboul, 8 were found which differed from the remaining 106, which were the ordinary *Oesophagostomum dentatum* in that they showed long tails and an enlargement of the oesophagus at the anterior end. A detailed description of the parasites is given.

BAYLIS (H. A.). **On *Gongylonema* collected in Italy during October, 1924, with some Observations on the Genus.**—*Jl. Trop. Med. & Hyg.* 1925. Feb. 2. Vol. 28. No. 3. pp. 71–76.

Worms belonging to the genera Hepaticola and Capillaria were found in rats and fowls respectively in situations which led to the supposition that they might be Gongylonema. Microscopic examination revealed the true nature of the parasites.

G. scutatum was found in sheep, goats, and cattle. Two specimens of gongylonema were found in pigs, but it was found that the pigs examined were fed on cheese factory waste and did not forage for themselves. Baylis is of the opinion that the parasite of the pig cannot be separated from *G. scutatum*, and, further, it is a matter of some doubt as to whether *G. neoplasticum* Fibiger and Ditlevsen should be separated from *G. scutatum*.

BLAIR (K. G.). **Some Notes on the Insect Intermediate Hosts of Gongylonema.**—*Jl. Trop. Med. & Hyg.* 1925. Feb. 2. Vol. 28. No. 3. pp. 76–81. With 7 text figures.

The author briefly reviews the recorded hosts and their habits.

The parasite has been found in the body cavity of many genera of coprophagous beetles, Ateuchus, Chironitis, Onthophagus, Gymno-

pleurus, Geotrupes, Aphodius, and Blaps. Under experimental conditions encysted larvae have been found in the meal worm, and in the musculature of different cockroaches, *Blattella germanica*, *Blatta orientalis*, and *Periplaneta americana*.

HALL (M. C.), SHILLINGER (J. E.) & CRAM (E. B.). **A Test of Raw Onions in the Diet as a Control Measure for Worms in Dogs.**—*Jl. Agric. Res.* 1925. Jan. 15. Vol. 30. No. 2. pp. 155–159.

The authors, after accurate experimental tests, come to the conclusion that raw onions in amounts of 2 ounces daily exercise too small an anthelmintic power to be of any value.

BELPEL (M. J.). **L'Habronemosi cutanea degli equini.** [Habronemiasis of the Skin in Equines.]—*La Clin. Vet.* 1925. Mar. Vol. 48. No. 3. pp. 163–175. With 6 text figs.

The author records the occurrence of this disease in Italy. He is of the opinion that the skin lesions are associated with the presence of the worm in the stomach. He does not hold the view that the infection is spread by contact.

HALL (Maurice C.). **The Occurrence of Cuterebrid Larvae in Dogs and Cats, and the Possible Modes of Infection.**—*Jl. Econ. Entomol.* 1925. Apr. Vol. 18. No. 2. pp. 331–334.

Cuterebrids of the genera Cuterebra, Bogeria, Rogenhofera, and Atrypoderma are normally parasitic in Rodentia and Lagomorpha, but evidence is accumulating that their occurrence in carnivora is not so rare as has been thought. The author summarizes the records of cases hitherto published.

Possible methods of infection are the eating of infected rodents and direct oviposition. Prenatal infection must also be borne in mind.

FRISON (Theodore H.). **Intestinal Myasis and the Common House-Fly (*Musca domestica* Linn.).**—*Jl. Econ. Entomol.* 1925. Apr. Vol. 18. No. 2. pp. 334–335.

A case of intestinal myiasis due to *Musca domestica* in a boy 16 years old is recorded.

In a discussion which followed it was stated that scores of cases of myiasis have been established by examination of larvae at Washington during the last 10 or 12 years.

ROBERTS (J. Isgaer). **On the Bionomics of *Hippobosca equina*.**—*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No. 1. pp. 81–90.

The fly has a limited distribution in North Wales, and is restricted to certain valleys in Carnarvonshire and Merionethshire. The distribution is governed by the presence of bracken, which is necessary for pupation, and the amount of sunshine. Horses and cattle are the chief hosts, but dogs are attacked.

Serious consequences may be caused by it frightening animals not accustomed to it. The diminution of horse transport has led to the fly attacking cattle. It was found impossible to keep the fly alive in the laboratory and conduct breeding experiments. It is generally found from May to August.

Decaying humus below bracken is the normal habitat for the deposition of larvae.

ANDERSON (Ch.). **Présence de** *Bullinus contortus* **dans l'oasis de Biskra (Algérie).** [The Presence of *Bullinus contortus* in the Oasis at Biskra (Algeria).]—*Bull. Soc. Path. Exot.* 1925. Mar. Vol. 18. No. 3. pp. 267–268.

BRUMPT (E.). **Particularités évolutives de l'***Amblyomma agamum*. [Details of the Evolution of *Amblyomma agamum*.]—*Ann. Parasit. Hum. et Comp.* 1924. Apr. Vol. 2. No. 2. pp. 113–120. With 3 text figs.

CAMERON (Thomas W. M.). **The Cestode Genus** *Mesocestoides* **Vaillant.**—*Jl. Helminth.* 1925. Feb. 1. Vol. 3. No. 1. pp. 33–44. With 16 text figs.

CRAM (E. B.). **A New Nematode,** *Cylindropharynx ornata*, **from the Zebra, with Keys to the Related Nematode Parasites of the Equidae.**—*Jl. Agric. Res.* 1924. May 17. Vol. 28. No. 7. pp. 661–672. With 8 text figs.

GOODEY (T.). **Observations on Certain Conditions requisite for Skin Penetration by Infective Larvae of Strongyloides and Ankylostomes.**—*Jl. Helminth.* 1925. May. Vol. 3. No. 2. pp. 51–62.

LEWIS (E. Aneurin). **Starlings as Distributors of "Gapes."**—*Jl. Helminth.* 1925. Vol. 3. No. 2. pp. 81–82.

ORTLEPP (R. J.). **Observations on the Life History of** *Triodontophorus tenuicollis*, **a Nematode Parasite of the Horse.**—*Jl. Helminth.* 1925. Feb. Vol. 3. No. 1. pp. 1–14. With 9 text figs.

THAPAR (G. S.). **On the Morphology and Systematic Position of** *Echinopharynx*, **a new Genus of Bursate Nematode from** *Testudo tabulata*.—*Jl. Helminth.* 1925. Feb. 1. Vol. 3. No. 1. pp. 19–32. With 10 text figs.

THAPAR (G. S.). **On Some New Members of the Genus** *Kiluluma* **from the African Rhinoceros.**—*Jl. Helminth.* 1925. May. Vol. 3. No. 2. pp. 63–80. With 32 text figs.

TURNER (W. Y.). **The Morphology of** *Filaria sagitta* **v. Linstow, 1907, from the Heart of** *Tragelaphus sylvaticus* **in Nyasaland.**—*Jl. Helminth.* 1925. Feb. Vol. 3. No. 1. pp. 15–18. With 6 text figs.

BACTERIAL DISEASES.

SACHELARIE (V.). **Etude comparative sur l'immunité conférée par la vaccination anticharbonneuse pratiquée par inoculation dans la peau et par la vaccination pasteurienne classique, chez les bovines.** [Intradermal and Subcutaneous Vaccination of Cattle against Anthrax.]—*Rev. Gen. Méd. Vét.* 1925. May 15. Vol. 34. No. 401. pp. 230–240.

It has been shown by BESREDKA and others that rabbits and guineapigs are resistant to infection with anthrax by any path other than the skin. The domesticated animals, on the other hand, are susceptible to infection by all paths. This is a point of considerable importance.

While guineapigs are susceptible to infection practically only by way of the skin, they can be immunized with certainty by the same path. The serum of such guineapigs has no protective power, and the conclusion is drawn by BESREDKA that the immunity possessed by such vaccinated guineapigs is due to the local immunization of the

skin and the natural power of resistance possessed by the other organs. On the other hand, the immunity conferred upon cattle and other large animals by the usual methods is one involving all the tissues, and this rests upon the production of antibodies, the existence of which in the serum is demonstrable.

The author briefly reviews the experiments of BROCQ-ROUSSEU and URBAIN, MAZUCCHI, and VELU regarding immunization via the intradermal route. These authors have, however, in testing their animals, given the test doses by the same path. This may merely test the local immunity conferred upon the skin. The important point to determine is whether the immunity acquired is general.

Quite recently intradermal vaccination has been practised on a vast scale in the Levant army, it having been found necessary to abandon the Pasteur method and sero-vaccination. In all, 10,000 animals were treated, and it will be necessary to wait a year before the results can be evaluated. It must suffice for the present to say that the experiment was carried out in an infected area under the best possible conditions.

The author's experiments have been designed to provide answers to the following questions :—

1. The comparative resistance of cattle immunized intradermally and subcutaneously with Pasteur vaccines to experimental and natural infection.
2. The protective powers of the sera of such animals.
3. What conclusions may be drawn regarding the method of vaccination to be employed in a country where infection is likely to be heavy and the organism very virulent.

For his experiments Sachelarie had available 9 heifers of approximately the same age and size. Five of these were vaccinated intradermally with first and second vaccines at an interval of 8 days. The remaining 4 were vaccinated subcutaneously by the Pasteur method.

For the inoculations the anal fold was selected, for the reasons that it does not require shaving, it is convenient, and it can readily be kept steady while the injections are made, and comparisons are easily made.

In animals vaccinated intradermally a local reaction occurs in the form of a small slightly painful swelling which persists for several days. There is also a slight oscillation of temperature. This reaction is more distinct than that shown by animals inoculated subcutaneously. A month after the vaccinations were completed test inoculations were begun.

In the first test two of each of the batches and two control heifers were inoculated intradermally with a virulent strain of anthrax of Roumanian origin. The following day the animals vaccinated intradermally showed no symptoms of any kind. In those vaccinated subcutaneously there was a rise of temperature to 39·5° C. and a painful oedematous swelling at the seat of inoculation. The control animals were seriously ill, and during the next few days they showed temperatures exceeding 41° C., and there was pronounced and painful swelling of the fold of skin. These symptoms persisted for three or four days, and then recovery took place. The animals lost condition very markedly.

From this experiment it would appear that intradermal inoculation afforded the greater amount of protection.

In the second test one heifer of each batch was inoculated, the

intradermal path being again selected, but 0·5 cc. of culture was used, instead of 0·25 cc. used in the first test. No control was inoculated. Again, the animal inoculated intradermally gave no reaction, while that inoculated subcutaneously showed a painful swelling and a rise of temperature.

In the third test, two vaccinated animals, one from each batch, and an unvaccinated control. These animals were fed with oats mixed with powdered glass and a quantity of sporulating anthrax culture. The test was therefore a very severe one. The control animal died of anthrax, but neither of the vaccinated animals showed the least sign of ill-health.

Fourth test. A heifer vaccinated intradermally was fed as in the previous test, but the amount of sporulating culture added was very much greater. The test resulted in a rise of temperature to a maximum of 40·6° C., and there was great prostration. Recovery followed, but there can be no doubt that this would not have taken place had the animal not been vaccinated.

The serum of this animal, taken on the day of the test, protected a guineapig against a fatal dose of anthrax in an amount of 2 cc.

It appears to be clear then that intradermal vaccination produces both local and general immunity.

Tests were carried out with the sera of all the heifers on guineapigs, and it was found that while doses of 1 cc. failed to confer immunity against the second vaccine, 1½ and 2 cc. conferred immunity. The sera of heifers after vaccination only and before test inoculations were found to be protective for guineapigs, and therefore it appears to be certain that intradermal vaccination establishes general immunity.

Monod (T.) & Velu. **Intradermovaccination en un temps contre le charbon bacteridien.** [Single Intradermal Vaccination against Anthrax.]—*Rec. Méd. Vét.* 1925. Feb. Vol. 101. No. 4. pp. 67–73.

During 1924, 40,000 single doses of sporulated vaccine were used in Morocco, and of these nearly half have been administered intradermally. In some districts the vaccine has been employed although no cases of anthrax were reported. In others it has been used after the use of protective serum which was employed for the control of outbreaks. In other places it has been used as a prophylactic and as a means of checking the disease after it had appeared.

Objection has been raised to the technique of injecting into the anal folds on the score of risk from kicks, and the skin behind the shoulder has been suggested as an alternative, but it must be pointed out that this seat of injection is open to the very serious objection that if the vaccine is by chance implanted through the skin serious results are likely to follow. Intradermic vaccination is not followed by any reaction.

Only in one case was the intradermal vaccination followed by ill effects. One veterinary surgeon reported loss of appetite, dullness and depression, followed by the appearance of piroplasmosis in some cattle and sheep. The appearance of the latter is not a matter for surprise, as it has been recorded on many occasions, but it is difficult to explain the general symptoms since the animals upon which the vaccine tests were carried out tolerated 1,000 doses without any reaction of this kind.

Serious losses were reported by one owner (7 out of 35), but the diagnosis was made by the owner and was based on splenic enlargement. The authors insist upon the difficulty of making a definite diagnosis in this way in a country where piroplasmosis exists, and where this disease is a greater danger than anthrax for cross-bred animals.

In testing the immunity two sheep which were in poor condition and which had been vaccinated intradermally eight months previously were injected with 1,000 m.l.d. of the Moroccan strain of anthrax. One died of anthrax and one of shock. It is pointed out that the test was immensely more severe than natural infection.

VELU (H.) & BIGOT (A.). **Vaccination du cheval contre le charbon bacteridien per intradermovaccination en un temps.** [The Protection of Horses against Anthrax by a Single Intradermal Vaccination.]—*Rec. Méd. Vét.* 1925. Jan. 30. Vol. 101. No. 2. pp. 40–49.

The authors have vaccinated experimentally 59 animals (horses and mules). They have used a sporulated vaccine which was of slightly lower virulence than that used in Morocco for the protection of oxen, sheep and pigs. The dose used was 0·25 cc. injected at one place.

After some experience the injection of the vaccine into the skin beneath the tail or the skin of the ear was abandoned, the former because restraint of the animals was difficult, and the latter because of the production of a painful swelling.

Finally, the skin of the neck was selected. If by accident the vaccine is introduced subcutaneously the only results are that there is a delay in the establishment of immunity and there is a more or less extensive local reaction. The authors give details of each animal treated in a tabular statement. Of the 59 animals treated, 38 showed no reaction. There was no general reaction in any case save one, and in this animal wasting was observed. Four animals showed elevations of temperature.

Test inoculations were carried out from 5 to 28 days after the vaccination, and these were given subcutaneously. Forty-eight animals showed no reaction. Of the remaining 11, 8 developed a slight temporary local swelling and the others a more persistent swelling, which disappeared slowly. One of these died of anthrax on the fourth day. In this particular case the whole of the vaccine was not introduced into the skin. The authors believe that the animal would have resisted natural infection.

WIGOTSCHIKOFF (G.). **Die Hautvakzination gegen Milzbrand.** [Skin Vaccination against Anthrax.]—*Zeitsch. f. Immunitätsforsch.* 1925. Feb. 16. Vol. 42. No. 2. pp. 105–112.

Five guineapigs were treated by applying ZENKOVSKY'S vaccine to a shaved area of skin with a tampon. The vaccine contained vegetative forms only.

No protection was conferred.

The author thought that possibly the immunization was not complete because of the impossibility of making certain that the full dose of vaccine was used. He therefore treated five further guineapigs by injecting 0·1 cc. of the first and second ZENKOVSKY'S vaccines intradermally. One dose of the first was given and four doses of the second.

The latter were 0·1, 0·1, 0·2, and 0·3 cc. respectively, and were given at weekly intervals. Subcutaneous injection of 0·1 cc. of virus proved fatal.

A second series of experiments was carried out with rabbits. Ten were used, but in only two was a degree of resistance to infection found.

In further experiments it was found to be possible to infect rabbits without involving the skin in the operation. The insusceptibility of the internal organs is only relative, and dependent upon the dose of infective material used.

CORDIER (G.). **Essais de cuti-vaccinations contre la fièvre charbonneuse. Résultats comparatifs de différentes méthodes.** [Cuti-Vaccination against Anthrax.]—*C.R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1309–1311.

Guineapigs had first and second anthrax vaccines applied to shaved areas of skin for 24 hours each at an interval of 12 days. When tested 24 days after the second vaccine by virulent culture placed on the skin for 24 hours, two-thirds of the animals succumbed. The actual numbers are not given. Sixteen days later the survivors received one-tenth cc. of the same virulent culture. All died.

In the second series of tests the vaccines were applied with friction for 5 minutes. The intervals were the same as in the first tests. When tested with virulent material, also applied with friction, three-fifths of the animals died. A second test 16 days later by the subcutaneous path failed to infect any of the survivors.

Intradermo inoculations.—The doses were 0·1 cc. of vaccines injected intradermally at an interval of 12 days. Intradermal test inoculations carried out later caused death in 12 out of 14. A second test killed 1 of the 2 survivors.

Three sheep were vaccinated by friction, and when tested with virulent culture applied in the same way one died. The two survivors failed to become infected by a second test inoculation.

Fifteen sheep were vaccinated intradermally. Fourteen of these survived a test inoculation, and one of these survivors died after a second test inoculation.

Three calves were protected by intradermal inoculation, and two of these showed only a rise of temperature when subjected to a test inoculation.

Two sheep were vaccinated by injection into bone marrow. Both survived intradermic and subcutaneous test inoculations.

A similar result followed vaccination into the testicular substance, care being taken to avoid contamination of the tunics of the organ.

In many cases fixation tests were carried out after the second vaccines, but no positive results were obtained.

NICOLAS (Eug.). **Intradermo-vaccination, contre le charbon bactéridien de 8,912 chevaux et mulets de l'armée du Levant.** [Intradermo Vaccination against Anthrax of 8,912 Horses and Mules of the Levant Army.]—*C.R. Soc. Biol.* 1925. Mar. 13. Vol. 92. No. 9. pp. 693–694.

The technique was as follows: The animals were first injected in three places 5 centimetres apart on the side of the neck with 0·25 cc. of first vaccine (Pasteur). They were rested on the following day.

From the third to the sixth day they did their normal work. On the seventh day the second (Pasteur) vaccine was given in the same manner on the opposite side of the neck. After a day's rest they were put to work again.

No ill-effects followed the first vaccine. In 22 per cent. there was a certain amount of swelling after the second vaccine was given. This appeared in from 2 to 53 days after the operation, but usually during the second week. These swellings were in most cases reabsorbed without treatment or after a dose of anti-anthrax serum. In four cases swellings occurred in parts of the body remote from the seat of inoculation, and two of these animals died.

A year later four cases of anthrax had occurred among the vaccinated animals, and two of these terminated fatally.

During the period 1919-1923, when subcutaneous injections of serum were given, and only in infected places, the mortality averaged 0·81 per cent. per annum.

In 1924, when the intradermo-vaccination was used, the mortality was 0·045 per cent.

SANARELLI (G.). **Sur la pathogénie du charbon dit "Interne" ou "Spontané."** [The Pathogenesis of so-called "Internal" or "Spontaneous" Anthrax.]—*Ann. Inst. Pasteur.* 1925. Mar. Vol. 39. No. 3. pp. 209–297.

This long paper is divided into sections dealing with the following points: (1) A review of the opinions at present held regarding the pathogenesis of "internal" anthrax; (2) The impossibility of reproducing experimentally the so-called "intestinal anthrax mycosis"; (3) the behaviour of anthrax bacilli in the alimentary tract; (4) the non-existence of the condition termed "intestinal anthrax mycosis"; (5) the manner in which anthrax spores behave in the lungs of animals; (6) the manner in which intestinal anthrax develops in animals infected with spores; (7) the production of the lesions in internal anthrax.

It is an opinion generally held that the so-called intestinal anthrax is due to the germination of spores, which have escaped the action of the gastric juice, in the intestine, and that the serious lesions are due to direct invasion of these parts by the bacilli.

So far all experiments designed to reproduce "natural anthrax" by experimental means have failed to yield convincing results.

Sanarelli's experiments, which are described in this paper, and which have been carried out with newly born and adult guineapigs and rabbits, indicate that it is almost impossible to induce infection in this way even with enormous doses. The bacilli are promptly destroyed by the gastric juice and by the intestinal secretions. In the great majority of cases similar results follow the administration of spores by the mouth. In some of these cases, however, death from anthrax occurred, and in these animals there were usually local lesions indicating that the infection had actually taken place by inoculation. There were, however, some cases in which no evidence of such localized infection was found.

The administration of spores by the mouth showed that they are not destroyed by the gastric juice, and, further, that they are incapable of germinating in the intestine. The intestinal secretions exercise anti-bacterial powers particularly when fresh, but even when old, or after subjection to heat, they inhibit multiplication.

The introduction of large quantities (100,000) of spores into the respiratory tract is followed by infection, but smaller doses, such as are capable of being dealt with by the local defences, fail to cause the disease. The spores are transported by the blood to various organs and remain there without producing any effect, and by degrees they are digested. In cases of this kind fatal infection can be caused by injecting some substance which will cause the formation of necrotic foci, or will disturb the physico-chemical relationships of the cell colloids. Substances which have been found capable of producing these effects are arsenic, quinine, lactic acid, sodium nucleinate, glucose, peptone, blood, milk, distilled water, and living and dead cultures of colon bacilli.

Pulmonary anthrax can be produced in this way, the chemical substance being injected into the air passages either immediately after, or some days after the injection of the spores. The exposure of animals that are " carriers " of spores, to adverse conditions, such as incubation at body temperature on a number of occasions, leads to reduction of cell resistance and infection. A similar result may be obtained by keeping such rabbits short of water (*i.e.*, feeding them with food which is deficient in water). Such a diet is fatal to normal rabbits in about 6 weeks, but " carrier " rabbits die in a week.

The lesions of the alimentary canal found in anthrax are not those of local infection, but result from blood invasion.

CORDIER (G.). **Sur la teneur en glucose du sang des animaux charbonneux. Action de l'insuline et du sérum glucosé dans l'évolution de l'infection charbonneuse.** [The Glucose Content of the Blood of Animals infected with Anthrax. The Effects of Insulin and Serum containing Glucose upon the Development of Anthrax.] *C.R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1307–1308.

The amount of glucose in the blood of animals affected with anthrax is so variable that no accelerating or retarding action can be ascribed to insulin or glucose serum in the evolution of the disease.

BASSET (J.). **Réceptivité du cobaye et du lapin au virus du charbon bactéridien.** [The Susceptibility of the Guineapig and the Rabbit to Anthrax.]—*C.R. Soc. Biol.* 1925. June 5. Vol. 92. No. 19. pp. 1513–1515.

The author is of the opinion that BESREDKA'S view regarding the susceptibility of the skin to anthrax, to the exclusion of other tissues, is too sweeping. He cites a few experiments designed to show that it is the subcutaneous tissue which is the most susceptible to infection. In his opinion the epidermis is really the only tissue which belongs to the skin proper. This has a low degree of susceptibility to anthrax.

BASSET (J.). **Pouvoir pathogène des spores pures de la bactéridie de Davaine.** [The Pathogenicity of Pure Spores of Davaine's Bacillus.]—*C.R. Soc. Biol.* 1925. June 5. Vol. 92. No. 19. pp 1515–1517.

A brief description is given of inoculation experiments designed to show that the spores of the bacillus of anthrax are less pathogenic than the vegetative elements.

BASSET (J.). **Spores pures de la bactéridie de Davaine dans les tissus lésés. Associations microbiennes.** [Pure Spores of the Anthrax Bacillus in Damaged Tissues. Bacterial Associations.]—*C.R. Soc. Biol.* 1925. June 5. Vol. 92. No. 19. pp. 1517–1519.

While the injection of anthrax spores in a state of purity is not necessarily fatal, the admixture of lactic acid renders a non-pathogenic dose pathogenic. The facts, according to the author, run parallel with those regarding *B. chauvaei*.

LECLAINCHE (E.) & VALLÉE (H.). **Sur la vaccination contre le charbon symptomatique.** [Vaccination against Blackquarter.]—*C.R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1273–1276.

The authors claim that the addition of 2 to 4 per 1,000 of "formol" to cultures kept at 38° C. yields sterile antigens which are far more active than filtered cultures.

Young cultures to which "formol" has been added become avirulent and non-toxic. Thus, one obtains a vaccine which resembles the non-toxic diphtheria vaccine.

Whole cultures so treated may be injected subcutaneously into guineapigs and bovines in doses of 0·5 to 5 cc. without any effect other than a slight œdema. When tested at intervals of 10 to 30 days these animals withstand several lethal doses of the same culture in its virulent state.

Experiments on a large scale are under way, and from these it is hoped to obtain information regarding the duration of the immunity.

WAGENER (K.). **Die Diagnose des Rauschbrandes.** [The Diagnosis of Blackquarter.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1925. April 1. Vol. 52. No. 2. pp. 73–179.

In this paper the author deals at length with the following points in connection with Blackquarter: Epidemiology, the animals susceptible to infection, symptoms, pathological anatomy, bacteriology, nomenclature, and the importance of diagnosis. The section dealing with the bacteriology of the disease is further divided into sections dealing with the morphology of the organism, experimental inoculations, serum diagnosis, and culture experiments.

The paper contains four text figures and concludes with a very extensive list of references.

ZANOLLI (C.) & SORDELLI (A.). **Identidad del Carbunclo sintomático y de "La Mancha."** [The Identity of Blackquarter with "La Mancha."]—*Revist. Med. Vet.* 1925 [Dec. 1824–Mar. 1925]. Vol. 7. Nos. 5 & 6. pp. 372–380.

1. The age of the animals attacked does not furnish any evidence that the two diseases are distinct.
2. The morpholoical and cultural characters of the causal organisms of the two diseases are identical.
3. The lesions produced in both guineapigs and sheep by inoculation with the two organisms are the same.
4. The organisms cannot be distinguished by serological tests or by neutralization of toxin tests.

SMITH (Theobald). **Pneumonia associated with *Bacillus abortus* (Bang) in Fetuses and New-born Calves.**—*Jl. Exp. Med.* 1925. May 1. Vol. 41. No. 5. pp. 639–647. With 2 plates.

Pneumonia of varying extent due to *B. abortus* may be present in calves. In some cases the pneumonia is established early, in others the pneumonia is found in calves which have survived for a few hours only, and in calves which have survived for a week or more.

The bacillus has been isolated directly or via the guineapig, or in both ways from many cases.

BEVAN (L. E. W.). **Infectious Abortion of Cattle. Notes on Agglutination.**—*Veter. Jl.* 1925. Mar. Vol. 81. No. 3. pp. 110–126.

Experiments with "devitalised" vaccines for the purpose of immunization have led to inconclusive results.

DUNCAN (J. T.). **The Rôle of the Domestic Cow in the Epidemiology of Undulant Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.*—1924. Nov. 20 & Dec. 11. Vol. 18. Nos. 5 & 6. pp. 318–327.

In this paper the author records a case of undulant fever in an Englishman from Rhodesia which was apparently caused by *B. abortus*. This view was supported by agglutination tests and by absorption tests. Culturally the organism also tended to resemble *B. abortus* more closely than *B. melitensis*.

GERLACH (F.) & MICHALKA (J.). **Über die häemorrhagische Septikämie der Schafe.** [Haemorrhagic Septicaemia in Sheep.].—*Zeitschr. f. Infektionskrankh. parasit. Krankh. u. Hyg. d. Haust.* 1925. Feb. 3. Vol. 27. No. 4. pp. 276–287.

The authors record what they believe to be the first cases of haemorrhagic septicaemia in sheep in Austria.

Only a few cases were observed. The principal lesions were sero-fibrinous pleurisy and broncho-pneumonia with necrosis. As was to be expected, a mixture of bacteria was found in the exudate and in the lung tissue, but a bipolar organism was found in a state of apparent purity in the bronchial glands.

The organism was pathogenic for mice and rabbits, but not for guineapigs. Intratracheal injection into a sheep produced dullness, a nasal discharge, and bronchial râles. A second intratracheal injection given ten days later caused the reappearance of symptoms. At the postmortem examination two abscesses were found at approximately the seats of injection, it being apparent that the entire doses had not been introduced into the trachea. The blood, lungs, bronchial glands, etc., were sterile, but a bipolar organism was cultivated from the abscesses in the neck. The organism was pathogenic for mice, and one of two pigeons inoculated died. The other pigeon and a fowl, although they showed evidence of illness, recovered. Subcutaneous inoculation of a lamb caused visible illness. There was a rise of temperature and acceleration of pulse and respiration, marked catarrh of the nasal mucous membrane, and muscular spasms. Death took place in 36 hours. At the postmortem there was sero-haemorrhagic

infiltration at the seat of inoculation, nasal catarrh, congestion of the meninges of the brain, petechiae on the pleura, epicardium and in the kidneys.

An antiserum was prepared from a horse, and by the use of this, coupled with thorough disinfection, deaths among the sheep were stopped.

NIIMI (D.). **Correlations between Haemorrhagic Septicaemia Organisms.** *Jl. Jap. Soc. Vet. Sci.* 1924. Dec. Vol. 3. No. 4. pp. 309–310. [Author's English abstract.]

The author has been unable to distinguish between *B. bubalisepticus*, *B. suisepticus*, *B. avisepticus*, and *B. bovisepticus* by morphological, cultural, or serological tests, nor has he been able to show any differences in their pathogenicity.

CAROUGEAU. **Lymphangite ulcéreuse à Madagascar.** [Ulcerative Lymphangitis in Madagascar.].—*Rev. Gen. Méd. Vét.* 1925. Jan. 15. Vol. 34. No. 397. pp. 8–9.

In this brief note the author states that no confusion has been made between ulcerative lymphangitis and bursati in Madagascar. The latter disease, so far as he knows, does not exist there, but he has known of the existence of ulcerative lymphangitis in the Island for nearly twenty years. He has differentiated the disease from sporotrichosis and from epizootic lymphangitis. The latter disease is not now known in Madagascar ; no cases have been seen since the importation of mules from Algeria was stopped.

A cure can be effected provided intervention is early. The best results have been obtained by intravenous injection of arsenobenzol or novarsenobenzol. Three or four injections, each of 3 grammes, are given at intervals of eight days. Secondly, favourable results have followed the subcutaneous injection of 50 to 60 cc. of blood taken from the animal itself every four or five days. Intravenous injections of 1–2 cc. of oil of turpentine every four days have been found useful.

All external treatments suitable to such cases must be applied at the same time.

EMOTO (O.) & NIIMI (D.) **Infectious Pneumonia in Sheep.**—*Jl. Jap. Soc. Vet. Sci.* 1924. Dec. Vol. 3. No. 4. pp. 345–346. [Author's English Abstract.]

Infectious pneumonia has been the cause of heavy losses among sheep every summer. At the postmortem examinations severe infestations with worms were found in the stomach and intestines. There was catarrhal pneumonia associated with pleurisy.

From the diseased lungs *Bacillus pyogenes*, *B. avisepticus*, a small Gram-positive bacillus, *Micrococcus catarrhalis*, a streptococcus, and a staphylococcus were isolated. The first three of these were considered to be of the greatest importance on account of their frequent occurrence, their virulence for lambs and laboratory animals and the serological reactions given with the serum of diseased lambs.

A mixed vaccine was prepared and used on the infected farm. Vermifuges were prescribed at the same time. The losses were reduced to one-tenth the number of previous years.

LIGNIÈRES (J.). **Sur la classification du microbe de la typhose aviaire.** [The Classification of Fowl Typhoid.]—*Bull. Acad. Méd.* 1925. May 5. Vol. 93. No. 18. pp. 500–505.

Lignières has had the opportunity of comparing the organism isolated in the Argentine (*Salmonella avium*) with *B. sanguinarium*—the cause of fowl typhoid in France—and concludes that they are identical.

SABELLA (A.). **Involutionsformen des** *Bacillus erysipelatos suis.* [Involution Forms of the Bacillus of Swine Erysipelas.]—*Centralbl. f. Bakt.* I. Abt. Orig. 1925. May 1. Vol. 94. No. 7–8. pp. 411–416. With 3 text figs.

The presence of Saponin in culture media used for the cultivation of the swine erysipelas bacillus leads to the production of involution forms. Bacilli so cultivated differ morphologically, culturally, and serologically from the original form, and these new characters may be impressed upon them.

TEPPAZ (L.). **Tuberculoses animales en A. O. F.** [Tuberculosis of Animals in French West Africa.]—*Rev. Méd. de Angola.* 1923. Aug. (No. especial consagrado ao 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 5.) No. 4. pp. 219-220.

Tuberculosis is rare among animals in French West Africa, but it is not correct to state, as has been done, that it does not occur.

The author summarizes briefly the reports previously published regarding the existence of the disease.

Teppaz has found 6 cases in three years at an abbatoir killing 20 to 30 bovines daily.

During 1923, although every suspicious lesion was subjected to biological examination, only a single positive result was obtained. Zebus must be considered as resistant to infection with tuberculosis.

Pigs appear to be resistant also. In all, 6 cases have been recorded, but the type of bacillus responsible has not been ascertained. No cases have been recorded in cats or dogs.

MYCOTIC DISEASES.

MICHELON. **Un cas d'abcès pulmonaire determiné par des Cryptocoques.** [A Pulmonary Abscess due to Cryptococci.]—*Rec. Méd. Vét.* 1925. Feb. 15. Vol. 101. No. 3. pp. 71–72.

The horse was under treatment for epizootic lymphangitis from July 11th to September 13th, 1924. It showed four abscesses on the lower lip, and abscess formation in the sublingual glands. A mallein test yielded a negative result. Under treatment the lesions cleared up. About a month later the horse was slaughtered on account of a fracture of the humerus. At the postmortem a small abscess was found in the apex of the right lung. The glands were enlarged but otherwise normal in appearance. On section a small quantity of yellowish white pus escaped. Close examination shewed that in reality there were three

or four abscesses close together. Microscopic examination revealed the presence of cryptococci in a state of purity. A minute abscess was discovered in one of the bronchial glands, and in this cryptococci were found.

The other organs were apparently normal.

GRONOW (A.). **Kultur- und Infektionsversuche mit dem** *Cryptococcus farciminosus.* [Cultural and Infection Experiments with the *Cryptococcus farciminosus.*]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. Dec. 30. Vol. 51. No. 6. pp. 601–615.

The greater part of this paper is occupied by a general survey of the state of knowledge regarding epizootic lymphangitis.

The organism was cultivated in two liquid media containing ox and horse serum respectively.

The medium had the following composition:—Ox serum 70, beef broth 30, grape sugar 2, and glycerin 2. It is not stated at what temperature the cultures were incubated. Growth began to appear in about a fortnight, on the surface of the medium and as a sediment. In the course of three weeks the surface was covered with a bluish-white growth. A horse inoculated cutaneously with culture developed an abscess at the seat of inoculation. Reference is made to cultures obtained on an agar medium, but the composition of this is not specified. Growth from solid cultures was also used for the inoculation of this horse at another part of the body. An abscess developed. Mycelial and yeast forms were found in the pus. No infection followed intraperitoneal inoculation.

Attempts to obtain evidence of infection by the complement fixation test using various extracts as antigen failed.

KÄMPER. **Die Lymphangitis epizootica des Pferdes.** [Epizootic Lymphangitis.]—*Arch. f. Wissenschaft. u. Prakt. Teirheilk.* 1924. Dec. 30. Vol. 51. No. 6. pp. 616–641.

This paper contains an account of the various methods of treatment which have been tried by the writer.

Seventy-five animals have been under his observation. Of these 19 died or were killed. Of the 56 which recovered 30 recovered without treatment. Eighteen were cured by operation, and one by curetting. Seven, or 37 per cent., of the animals treated by medicinal means recovered.

The author's observations lead him to think that the cryptococcus may persist for months in encapsuled abscesses. Outside the body they may retain their vitality for 6 months.

BIGOT (A.) & VELU (H.). **Isolement rapide de** *Cryptococcus mirandei* **en culture pure.** [The Rapid Isolation of *Cryptococcus mirandei.*]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 127–129.

The methods used have been based upon those devised by PIELTRE and DE SOUZA for soil investigations, and by BAROTTE and Velu for the cultivation of the cryptococcus of RIVOLTA. The principle of the method is the use of media acidified with citric acid to the extent of 5 per mille.

A fragment of a tumour from a donkey's eye placed on Sabouraud's agar acidified in this method and incubated at 32° C. appears swollen after 24 hours, acquires a creamy white tint, and is surrounded by a greyish margin.

A subculture on ordinary or acidified Sabouraud yields an abundant pure culture in 24 hours.

The acidified medium was found to prevent the multiplication of accidental organisms.

No growth was obtained in acidified peptone broth, and subcultures on Sabouraud's agar after 24 or 48 hours also failed to grow. Acidified peptone broth appears therefore to have a sterilizing action.

JEAUME (G.) & DEKESTER (M.). **Isolement de l'agent pathogène de la Blastomycose des voies lacrymales.** [The Isolation of the Cause of Blastomycosis of the Lachrymal Tract.]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 125–127. With 8 text figs.

Cultures of the organism can be obtained upon Sabouraud's medium and on dung agar, and on many of the ordinary media. The optimum temperature appears to be about 30° C., and at this temperature visible growth is obtained within 24 hours. On agar media the organism forms a continuous glistening layer which is readily detached. As cultures become older they turn brown, become dry and wrinkled. In peptone broth there is first formed a flocculent deposit at the bottom, then a ring of growth forms round the surface of the medium, and this finally becomes covered with a surface growth.

The organism possesses great vitality, and subcultures can be obtained from tubes which have been left in the laboratory without special precautions for a year or more. The organism appears as a rounded or oval body which may be drawn out at one end, and may or may not show a refractile granule.

Multiplication in broth is by budding, and actual chains may be formed. Some of the organisms become elongated, but true filaments have not been observed.

On agar the cells rapidly increase in volume and may measure 7–8μ. The wall becomes thickened and the refractile granules increase in number.

On carrot multiplication comes to a stop rapidly.

On two occasions the authors have been able to produce lesions in donkeys experimentally with cultures. The organism is provisionally placed in the genus Cryptococcus.

DISEASES DUE TO FILTERABLE VIRUSES.

REPETTO (R.). **Quelques cas de rage canine au Bas-Congo.** [Canine Rabies in the Lower Congo.]—*Rev. Méd. de Angola.* 1923. Aug. (No. especial consagrado ao 1º Congresso de Med. Trop. da Africa Ocidental. Vol. 5.) No. 4. pp. 113–114.

An outbreak of what appeared to be rabies occurred at Mayumbe in June, 1922. Diagnosis was based upon clinical evidence, as means were not available for biological or histological examinations. It appeared to be probable that the outbreak was an extension from that which had occurred earlier at Brazzaville.

In October cases occurred at Boma. In these cases detailed examinations were made. Typical Negri bodies were discovered in the brains of two cases.

Animals inoculated subdurally from the first case died, probably because the material used was putrid, on the following day. Two rabbits inoculated subdurally from the second case also died on the day following the operation. Two guineapigs and two rats inoculated subcutaneously survived. Two dogs inoculated with brain tissue kept in glycerin for 13 days also survived.

A specimen of fixed virus from the Antirabic Institute at Sassari was used for the inoculation of two dogs subdurally, and to guineapigs and two rats subcutaneously. None of these became infected. This virus had been obtained from Europe 2 months previously and was considered to be exceedingly virulent.

REMLINGER (P.). **Vaccination du chien et du chat contre la rage au moyen du virus-éther.** [The Vaccination of Dogs and Cats against Rabies by means of Virus treated with Ether.]—*C.R. Soc. Biol.* 1925. May 8. Vol. 92. No. 15. pp. 1195–1196.

The experiments have been carried out with the brains of rabbits, the spinal cords of which are used for human protective inoculations. The brains are immersed in ether for 25, 20, and 15 hours. They are then emulsified with 50 cc. of sterile salt solution and filtered through muslin. The injections are made subcutaneously every day or every other day. A whole brain is used at each injection for a dog, and half for a cat. It is not held that either the periods of immersion or the doses are definitive.

Brains may be kept in glycerin until they are required, and may be then immersed in ether, and etherized brains may be placed in glycerin for transmission to places where they are required.

Further experiments are under way in which the brains of rabid dogs are being tested as vaccine in this way, and a further account of the results is promised.

GUYON (M.). **Curieux effets de la fièvre aphteuse chez des brebis.** [Curious Effects of Foot and Mouth Disease in Sheep.]—*Rec. Méd. Vét.* 1925. Feb. 15. Vol. 101. No. 3. pp. 73–74.

The author records the occurrence of lactation in ewe lambs which had not been served as a result of mild attacks of foot and mouth disease.

MAGALHAES (O. de). **Typhose aviaire.** [Avian Typhoid.]—*C.R. Soc. Biol.* 1925. June 12. Vol. 92. No. 20. p. 31.

The author states that in parts of Brazil he has observed a disease resembling fowl cholera which is due to a bacillus almost identical with *B. sanguinarium*. Once out of 150 experiments he has infected a fowl with virulent liquid passed through a Berkefeld filter. This, he states, must be confirmed.

Vaccination on a large scale (12,000) has completely cleared up endemic centres of infection.

GRANOUILLIT (M.). **Les abcès de fixation dans la peste du buffle.** [Fixation Abscesses in the treatment of Cattle Plague in Buffaloes.]—*Rev. Vét.* 1925. May. Vol. 77. No. 3. pp. 295–297.

The author has found that the injection of 10 to 15 cc. of oil of turpentine into the subcutaneous tissues of the brisket is of value for the treatment of cattle plague in buffaloes.

SCHEIN (H.) & JACOTOT (H.). **La Séro-infection : vaccination préventive contre la peste bovine.** [The Serum-Simultaneous Inoculation against Cattle Plague.]—*Arch. Inst. Pasteur d'Indochine.* 1925. Apr. No. 1. pp. 48–56.

The authors discuss the three factors concerned in the serum-simultaneous inoculation of cattle against cattle plague. They conclude that the part played by variation in the strength of the serum is slight. The virulence of the virus is of more importance, but the most important factor is the general condition of the animal, and, in conjunction with this, the hygienic conditions under which the animals are kept.

CURASSON (G.). **Introduction de la Blue Tongue en Afrique Occidentale Française.** [The Introduction of Blue Tongue into French West Africa.]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 215–218.

The author gives the history of the introduction of Blue Tongue into Senegal, which occurred towards the end of 1923.

The disease was introduced in merinos imported from South Africa. On arrival they were divided into three lots to be sent to different destinations. After the initial cases the disease died out in two districts where there were no mosquitoes, but persisted in the third where mosquitoes abounded.

ONO (S.). **A Study of Contagious Pleuro-Pneumonia in Imported Cattle.**—*Jl. Jap. Soc. Vet. Sci.* 1925. Mar. Vol. 4. No. 1. pp. 45–48. [Author's English abstract.]

Contagious bovine pleuro-pneumonia first appeared in Japan in September, 1924, when three cases were detected at the Yokohama Quarantine Station among 42 Mongolian cattle imported from Dairen, China.

KIMURA (T.), FUKUSHIMA (T.), & FUJII (T.). **Pathologische anatomie von Lungenseuche (Pleuropneumonia bovis contagiosa) der Rinder in Chosen.** [The Morbid Anatomy of Contagious Bovine Pleuro-Pneumonia in Korea.]—*Sei-i-Kwai Med. Jl.* 1925. Feb. Vol. 44. No. 1. p. 16. [German Abstract of Japanese original article.]

The authors describe the results of their examination of specimens from nine cases of pleuro-pneumonia, obtained during an outbreak in 1922. There appears to be nothing new in the paper.

MISCELLANEOUS.

JOHNSON (E. L.). **Relation of Sheep to Climate.**—*Jl. Agric. Res.* 1924. Nov. 15. Vol. 29. No. 10. pp. 491–500. With 18 charts.

The author adduces reasons, based upon records, why climate must be taken into consideration in the selection and development of various breeds of sheep.

The important periods are the rutting season, period of pregnancy, and of lambing, during which climatic conditions should be favourable.

Sheep thrive best in areas where summers are cool, winters mild, and where the rainfall is sufficient to produce good grazing. The areas of dense sheep population fulfil these conditions.

MARSH (C. D.). **Stock-Poisoning Plants of the Range.**—*U.S.A. Dept. Agric. Dept. Bull.* No. 1245. 1924. Dec. 22. 36 pp. With numerous figs. & plates.

While figures are not available, it is estimated that poisonous plants cause a loss of from 3–5 per cent. of range animals, and it is probable that in some States the figure is much higher. In Wyoming sheep farmers estimate their loss at over 14 per cent. The Bulletin under review has been published with a view to assist stock owners to minimize their losses. Extensive investigations and experiments have been and are being carried out, and definite results have been obtained. To make the publication more valuable to owners many of the illustrations are given in colour. The plants dealt with are as follows:—Liliaceae, Fagaceae, Chenopodiaciceae, Ranunculaceae, Rosaceae, Leguminosae, Rhamnaceae, Umbelliferae, Ericaceae, Asclepiadaceae, Compositae, Ferns.

DONATIEN (A.). **Les Maladies microbiennes des animaux domestiques in Algérie.** [The Diseases of Animals in Algeria.]—*Rev. Gen. Méd. Vét.* 1925. Feb. 15. Vol. 4. No. 398. pp. 65–77.

This paper is a summary of existing knowledge regarding the diseases of live stock in Algeria. It is divided into four sections, which deal respectively with (1) diseases, the nature of the virus of which is still unknown; (2) bacterial diseases; (3) diseases due to filterable viruses; (4) protozoal diseases.

ADLER (S.). **A Disease of Fowls in Palestine characterised by Leucocyte Inclusions.**—*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No 1. pp. 127–135. With 17 text figs.

The disease produced shows some resemblance to Spirochaetosis clinically, but is not amenable to treatment with atoxyl or neo-salvarsan. It is of economic importance as it attacks imported breeds and cross-bred poultry. Native fowls are not observed to be attacked. The symptoms are dullness and inappetence, followed by a rise of temperature and diarrhoea. Death takes place in 7 to 14 days.

The inclusions found in the leucocytes were of the following varieties:

(1) Minute granules of chromatin surrounded by a vacuole.
(2) Small regular rings of chromatin.
(3) Spherical solid masses of chromatin.
(4) Irregular bacilliform masses of chromatin.
(5) Clusters of minute granules of chromatin not lying in vacuoles.

Similar inclusions were noticed in the interior of the nuclei of infected cells. The granules were readily distinguished from the ordinary leucocyte granules of the fowl's blood. With Romanovsky they stained like the nuclei of malaria parasites, but more brilliantly. The inclusions present varied very largely in number in different cells.

The percentage of infected cells was as high as 18, and in cells in which the number of inclusions was very large the nucleus had practically disappeared.

On postmortem affected fowls showed the following lesions :—The liver was enlarged and softened, and showed areas of fatty degeneration. There were areas of necrosis in the kidneys.

The evidence obtained by the examination of the blood of apparently normal native birds indicated that these acted as carriers.

MACFIE has expressed the opinion that the inclusions are similar to those described by him as occurring in diseased fowls in the Gold Coast and Nigeria.

Atoxyl, neo-salvarsan, and bismuth sodium tartrate were without curative effects. The disease can be transmitted by blood inoculation.

Experiments failed to provide conclusive evidence regarding the possible transmission of the disease by *Argas persicus*.

LATHBURY (E. B.). **A Case of Snake Bite in a Dog treated with Antivenine Serum.**—*Jl. Royal Army Med. Corps.* 1925. Apr. Vol. 44. No. 4. pp. 290–291.

The dog was bitten by a " pitless " Russells viper. A dose of 15 cc. of anti-venom serum was injected into each flank. There was considerable swelling around the bite, which was on the eyebrow, and subsequently some difficulty in swallowing. For some days the dog could take little or no nourishment and lost a great deal of flesh. Eventually recovery occurred.

WRIGHT (T. W. W.) & TULL (T. C.). **A Preliminary Report of an Investigation of a Condition known as "Dry Coat" in Horses.**—*Veter. Jl.* 1925. May. Vol. 81. No. 5. pp. 235–240.

This condition has been seen in race horses and polo ponies in Penang during the last few years. It occurs in animals imported from Australia.

The clinical aspect of the disease is as follows :—There is a steady decrease in the amount of sweating shown by affected animals after severe exercise, until there is practically no evidence of perspiration at all.

In a few cases animals severely affected have continued to race, but such horses are difficult to keep in condition owing to their capricious appetites. One animal which had had " dry coat " for a year collapsed and died immediately after a race.

Such cases are, however, exceptional. As a rule, with the first appearance of " dry coat " exercise produces dyspnoea which may last for several hours. There is general dullness and laziness. The temperature is high, blood pressure is greatly increased, and the pulse rapid. No oedema has been observed, but there is a diminution in the amount of urine passed. As the case progresses, the animal can scarcely walk, the hair falls out, there is constant fever, and the urine contains albumen and casts.

Opportunity offered to make a complete examination of one mare which was known to have had a " dry coat " for over a year. All attempts at treatment had failed.

The stomach contained numerous specimens of a small worm, probably *Habronema microstoma*. There was an abscess about the size of a pigeon's egg with thick fibrous walls containing worms, probably *Habronema muscae*.

The caecum and colon were heavily infested with small worms which were not particularly identified. The kidneys were enlarged, the enlargement mainly involving the cortex. Microscopically, the smallest vessels were found to be reduced in lumen. Bowman's capsule was thickened. The glomeruli were shrunken, and there was a distinct space between these two structures. The epithelium of the tubes was swollen and granular. The tubules contained hyalin casts. The heart was hypertrophied and weighed a little under 9 lb. The valves showed no gross changes, and there was no pericarditis.

Sections of the aorta showed that the interior was thickened ; there was a reduction in the amount of elastic tissue, but the muscular coat appeared to be normal. The liver was enlarged and fatty, and on section many small necrotic foci were found. There was no cirrhosis.

The spleen was normal. The lungs were emphysematous, but there was no evidence of bronchitis.

Sections of a piece of skin that was devoid of hair showed the following changes. There was moderate thickening of the epidermis, and an almost complete absence of elastic fibres in the chorium. The hair follicles were shrunken. No normal sweat glands could be recognized. Those seen were atrophied to a considerable extent and partially replaced by fibrous tissue.

In view of these findings it was decided to make cultures from the blood of future cases.

It is stated that from each of four cases the same organism has been isolated and autogenous vaccines prepared. No description of the organism is given, but further information is promised.

Details are given of the four cases treated with the vaccines, and definite improvement is reported in each case.

WITJENS (J. C.), VAN LEEUWEN (J. F. H. L.) & VAN DER HOEK (J.). **Influenza equorum.**—*Ned. Ind. Bladen v. Diergeneesk.* 1925. Apr. Vol. 37.

In August a disease appeared amongst the horses at the artillery depôt at Tjimahi, and within a few days a series of cases appeared.

Negative blood examinations allowed surra, anthrax and piroplasmosis to be eliminated. Pernicious anaemia was suggested by the extravasations in the conjunctivae, but against this were the very rapid spread and inflammation of the subcutis, tendons and tendon-sheaths, as well as the absence of lesions in the bone-marrow and the characters of the blood.

It is to be expected that the disease should be introduced from Australia, from which horses are imported every year, and the authors mention several past outbreaks of disease that were probably outbreaks of influenza.

In their description of the disease the authors point out that diagnosis may at first be difficult, as many cases fail to show characteristic symptoms. They lay emphasis on the character of the

symptoms shown by the eyes and neighbouring structures, and on the swelling of the extremities, especially over tendon-sheaths. The course was generally favourable, and little loss of condition was noted. The temperature fell suddenly after about a week of fever, and 3 weeks' convalescence was needed.

They failed to check the outbreak by methods of isolation and disinfection, and they decided therefore to get it over quickly by artificial infection of the healthy, as was done in Holland by BEMELMANS.

Blood was taken aseptically from affected horses, defibrinated and diluted with 3 vols. of normal saline; it was injected subcutaneously, in the neck, in doses of 20 cc.

The following injections were performed :—

GROUP I.—*Infection with diluted blood taken from a naturally-contracted case*—
- A. 10 horses, of which 9 reacted.
- B. 31 horses, of which 30 reacted.

GROUP II.—*Infection with diluted blood taken from an artificially infected horse (injected from a natural case)*—
- A. 44 horses, of which all reacted.
- B. 20 horses, all of which reacted; in this case the virus was used after preservation at room temperature for 24 hours.
- C. 20 horses, of which all reacted; virus kept at room temperature for 48 hours.

GROUP III.—*Infection with blood from one of the horses of* GROUP II (*i.e.*, "*passage-virus*")—
41 horses, of which all reacted.

In the course of these inoculations it was seen that the older animals suffered more severely—higher temperatures and more affected clinically.

It appeared that thoroughbreds (*i.e.*, officers' chargers) were less severely attacked.

Only one horse died—a 16 years old Australian gelding. The two horses which failed to react were re-injected, and one then showed a slight reaction; the other was unaffected and probably had a natural resistance.

In 104 horses out of 125 the incubation period was 40 hours; the horses in Group I are omitted from this, as they had been in contact with natural cases.

Altogether 166 horses were injected; the incubation period was 40 hours in 104 cases, as stated above, and it varied from 1 to 15 days. The temperature reached a maximum between 40° and 41° C. in 64 per cent. of cases, and attained 41° C. or over in 29 per cent.

The duration of the fever was from 2 days to as much as 16 or 20 days, averaging about 8 days.

At the depôt there were 98 natural cases; 2 died and one horse had to be destroyed. A careful comparison of these figures, and of the intensity of the temperature reactions and symptoms, showed that the artificial infections were certainly not more severe than the natural cases.

This agrees with the results of BEMELMANS, but not with the views of HUTYRA and MAREK (1922). Moreover, HUTYRA and MAREK state that horses may again become sick one or two weeks after recovery from an infection; but the authors reinjected a few horses after recovery from artificial infection and failed to cause any further signs of disease. They note also that many horses were in contact with natural cases long after their own recovery from artificial infection, but none showed any further illness. A little later there was an

outbreak amongst the horses of another unit, and, as isolation again failed to check it, artificial infection was again resorted to. There were 34 natural cases, and 106 were artificially infected; one horse failed to react, 2 died and one had to be killed on account of posterior paraplegia.

No horses were moved from this garrison within 2 months of the recovery of the last-occurring case, and rigorous disinfection was carried out.*

PREUSS (O. K.). **Osteoporose.**—*Ned. Indische Bladen v. Diergeneesk. en Dierenteelt.* 1925. Apr. Vol. 37. No. 2. pp. 178–181.

The author records three cases of osteoporosis occurring in the same livery stables at Soerabaya—one case in September, 1923, and two in February, 1924.

In the first case the horse, which had been imported from Australia as a racehorse 5 years previously, had not been worked for some months prior to the day of the appearance of symptoms. On that day it was ridden, and at the walk and trot seemed to be fatigued, but when galloped it broke down immediately. The rider then found that both fore- and one hind-limb appeared to be seriously injured, and within an hour the other hind-limb also became affected.

The writer found that the forelimbs had given way, so that the fetlocks came to the ground, and the soles of the feet were almost vertical; the hind feet rested on the heels and bulbs, and the soles made an angle of about 45° with the ground. One hind leg was continually kicking and the hoof, which was bleeding, was seen to dangle.

The horse was destroyed, and on postmortem it was found that in both the forelegs all the lower attachments of the sesamoid ligaments (lig. sesamoidea obliqua, cruciata, et rectum) had been torn away from the sesamoid bones; a few small pieces of bone were still attached to the ends. In both hind legs the flexors were separated from the os pedis, and here again the ends of the tendons showed bone-splinters, the size of a grain of sand, still attached. There were infiltrations with blood in the subcutis in one foreleg, and in one hind hoof the sensitive and horny laminae were separated by blood.

The idea that the cause was mechanical, the writer's first impression, was abandoned, and he took all the evidence to indicate a case of osteoporosis.

In the second case the horse, a small Javan, 10 years of age, was said by the owner to have rheumatism. The gait was peculiar, the horse moving very carefully and taking short steps; and after a little trotting it began to stumble. No abnormalities of the bones could be detected, and the muscles were not sensitive to pressure. The author prescribed pot. iodide and special diet, and some improvement in condition occurred, but the animal died a month later.

The third case was seen by LENSHREK, who diagnosed osteoporosis, and had the horse shot. No clinical description is given, on account of LENSHREK's illness and absence, but he sent specimens to MÜLLER for pathological examination. MÜLLER found:—Tendon of deep flexor, especially distal part and fibres of attachment, lacerated and torn loose from os pedis. The articular cartilage showed light yellow linear irregularities. The ligamentum transversum and tendinous attachments of the superficial flexor showed no abnormality.

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

Coronary bone—externally on volar surface—linear greyish areas. Microscopically MÜLLER found :—At the ridges of the articular cartilage, the uppermost layers of the cartilage (nearest joint cavity) had separated in the form of wavy strings. At junction of cartilage and bone a cavity was pushed into cartilage. The long lamellae were surrounded by a layer of osteoid tissue.

The lacerated tendon still bore at its insertion-ends a layer of bone, which, moreover, lacked the typical structure of compacta. Numerous bone canaliculi with vessels grew in the direction of the tendon, and between these vessels were found small spherical lime concretions and some infiltration with lymphocytes.*

MOUSSU (R.). **L'intoxication par les graines de *Cassia occidentalis* L. est due à une Toxalbumine.** [Intoxication by the Seeds of *Cassia occidentalis* L. is due to a Toxalbumen.]—*C. R. Soc. Biol.* 1925. Mar. 27. Vol. 92. No. 11. pp. 862–863.

ERRATA.

Vol. 13, No. 1, p. 1, last line of summary of VAN DER ELST'S paper, and in title of WALRAVENS' paper, *Trypanosoma rodhain* should read *Trypanosoma rodhaini*.

Vol. 13, No. 1, p. 6, 14th line from bottom, the name of the first author of the paper on *Eimeria utinensis* should read SELAN (U.) not LELAU (U.).

---

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.